



BARGAIN HUNT
WHO WILL THINK
BIG BY SECURING
USED A380 FLEET?
REPORT P32

NEO ADDITION
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commercial debut with
first re-engined A320 **9**

TIGER FEAT
French army sets sights
on multinational project
to give attack helicopter
missile upgrade **10**

FLIGHT

INTERNATIONAL

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26 JANUARY-1 FEBRUARY 2016

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COVER IMAGE

This NASA illustration shows Boeing's concept for a future supersonic airliner. We look at the challenges facing any Concorde successor **P24**



BEHIND THE HEADLINES

Craig Hoyle flew in to attend the Bahrain International Air Show, and witnessed Gulf Air reveal its future fleet plan (P10). The Flightglobal team was also out in force at the Airline Economics Growth Frontiers conference, staged in Dublin, Ireland (P9)



NEXT WEEK ISRAEL

Our country special reviews Israel's vital aerospace and defence sector, and looks at its preparations for the F-35

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What should succeed the ISS? **P23**. Bombardier ramps up CS100 production with first delivery imminent **P11**

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IMAGE OF THE WEEK

Austrian air force Eurofighter Typhoons provided air policing cover of the World Economic Forum, hosted in Davos, Switzerland, from 20 January. Flightglobal's Fleets Analyzer database records the service as operating 15 Tranche 1 production-standard Eurofighters

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Geoffrey Lee/Planifocus

THE WEEK IN NUMBERS

↑ **80%**

Flightglobal dashboard

Increase in charges at large European airports since 2005, leading lobby group Airlines for Europe to call for reform

\$288m

Flightglobal dashboard

Value of MRO and pilot training contracts secured by ST Aerospace during the fourth quarter of 2015

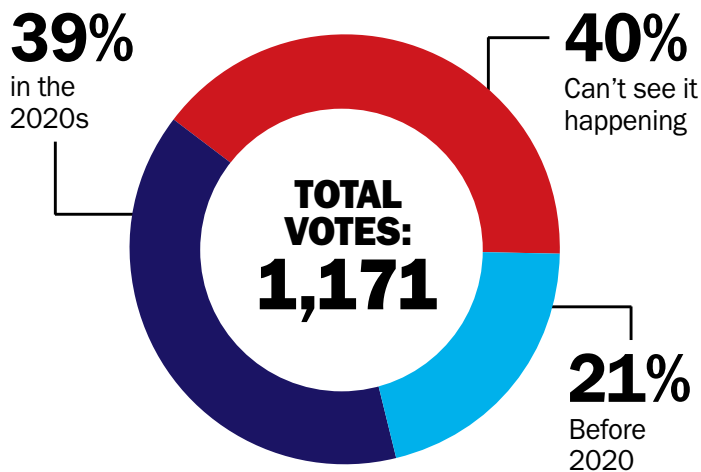
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Flightglobal dashboard

Aircraft deliveries deferred by Thai International Airways – 12 Airbus A350-900s and two Boeing 787-9s

QUESTION OF THE WEEK

Last week, we asked: **When will Airbus or Boeing first deliver 1,000 aircraft in a year?:** You said:



This week, we ask: **A380 prospects on secondary market?**

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Paying for speed?

Breakthrough work by NASA and industry partners is promising supersonic aircraft that don't break eardrums and windows on the ground, but noise isn't the only barrier to their uptake

Those who mourn the passing of the Concorde era have cause to do more than mark last week's anniversary – now a full 40 years ago – of the inauguration of commercial supersonic air service. For there is much cause to hope that NASA is poised to drive forward into a new age of Mach-plus transportation.

As we report this week, money may be forthcoming for NASA to develop a flying X-plane to demonstrate a next-generation speed machine able to break the sound barrier – not of Mach 1, but of the ear-splitting, window-shattering sonic boom.

If NASA ultimately proves an aircraft can be shaped to beat the boom, and if trials go on to show that resultant noise falls below the limit of what people on the ground will tolerate, then maybe – sometime around 2020 or so – aircraft companies can start thinking seriously about developing a successor to Concorde.

When it comes to speed, the rule that always applies is that faster costs a lot more money

The prospects are exciting. If ground-level noise can be muted enough to convince legislators, especially in the USA, to lift the bans on overland supersonic flight that so restricted Concorde, the market for supersonic aircraft might finally break open.

Since Concorde's day there has been a surge in demand for long-haul air travel. Wealthy people, who certainly value their time, are criss-crossing the globe like never before. Speed looks more than ever like a winning proposition.

Or does it? First, let's not lose sight of the fact that it was not only noise that did for Concorde. Operating



Bruce Adams/ANL/REX/Shutterstock

Best left in the past?

costs were terminal in any normal commercial context. A 2020s version would presumably be far less thirsty of fuel and maintenance, but it's a certainty that such an aircraft would still be very, very expensive to buy and to operate. In any business, speed costs money – and it usually costs a lot.

But whatever the technical possibilities, the other cause for commercial caution is that the world has changed dramatically since Concorde's time. Real speed today means email, teleconferencing and advanced satellite communications. Some of those wealthy enough to pay for supersonic transport may choose to do so – but many may still opt for normal first-class travel. Airlines will surely up the competitive ante with ever-more-sumptuous offerings too.

Fast forward to the mid- or late-2020s, when virtual reality technology will have transformed conference calling and the market for business travel. It's not obvious that the speed of physical travel will have quite the same appeal it did back in the 1970s. ■

See Feature P24

The A380's second life

Willie Walsh's enthusiasm for the A380 – and disclosure that British Airways is looking at adding up to half a dozen used examples to its fleet – only serves to remind us what an enigma the Airbus big beast is.

The chief executive of IAG – which is eyeing second-hand A380s for Spain's Iberia as well as the UK flag-carrier – is a huge fan of the double-decker and loves the way BA has been able to, for instance, free up a precious Heathrow slot by swapping three Boeing 747 services to Los Angeles with two A380s.

According to Walsh, the superjumbos are flying full; passengers love them and they make a bold brand statement. So why does BA, the biggest operator of 747-400s, not want any more new A380s than the 12 it

has already ordered? Quite simply, it would seem, because the \$430 million price tag is too high. There are only certain routes where BA can be sure these four-engined 550-seaters would pay their way.

This is Airbus's quandary. Discount its new A380s much more to convince the likes of Walsh and the programme will never break even. Hold firm on price and airlines are likely to stay wary.

Toulouse may be struggling for orders, but Walsh's paeon to the ultra-large aircraft suggests that the A380 could enjoy an unlikely second life on the secondary market. Perhaps Airbus's superjumbo may not be quite the white elephant many suspected. ■

See This Week P9



Stay on top of the latest news and analysis of the commercial aviation sector, by going to: flightglobal.com/dashboard



BRIEFING

EXECUTIVE OPERATOR K5 FIRMS ACJ319NEO DEAL

ORDER Germany-based VIP aircraft provider K5 Aviation has firmed an order for a re-engined Airbus ACJ319neo. No engine selection for the corporate jet has been disclosed, but Airbus has confirmed the deal following a tentative commitment from the customer unveiled at last year's Dubai air show. Airbus is planning to deliver the green aircraft to an undisclosed completion centre in the first half of 2019.

HEXCEL TO CONSTRUCT MOROCCAN FACILITY

SUPPLY CHAIN Composite specialist Hexcel is to build a plant in Morocco to supply lightweight materials. The US-headquartered firm says the \$20 million plant will be constructed in an industrial free trade zone near Casablanca airport and will be located close to facilities belonging to customers Airbus, Aircelle, Bombardier and Boeing-Labinal joint venture MATIS Aerospace.

UNKNOWN OBJECT STRIKES COLOMBIAN A320

INVESTIGATION Colombian investigators are trying to ascertain the nature of an object which struck an Airbus A320 at cruise altitude in the country's airspace. The LAN Colombia aircraft had been operating flight 4C3509, a service to Bogota from Cancun, on 10 January. Inspection of the aircraft revealed a 20cm (8in) depression on the forward left-hand side of the aircraft, according to preliminary information revealed by French investigation agency BEA. The twinjet continued to Bogota without further incident.

RAF TORNADO SQUADRON TO SOLDIER ON

EXTENSION Further detail from the UK Ministry of Defence's November Strategic Defence & Security Review has revealed the retirement of the next squadron of Royal Air Force Panavia Tornado GR4s will be pushed back to 2018, from a previous target of 2017. The RAF's final examples will leave use the following year.

WARSAW NEARS DECISION IN UAV CONTESTS

PURCHASE Poland's defence ministry is moving forward with its effort to select mini and tactical unmanned air vehicles, having launched the process early last year. Final requirements are likely to be released in late January, with local news agency PAP reporting that a deal should be signed early this year. Warsaw plans to acquire 12 mini and 10 tactical UAV systems, with the selected models to be delivered by 2017 and 2018, respectively.

UNITED PICKS 737S TO REPLACE REGIONAL JETS

FLEET United Airlines has ordered 40 Boeing 737-700s as part of a programme to retire its fleet of small regional jets. Deliveries of the 737s will begin in the middle of 2017 and will allow the Chicago-based carrier to reduce its fleet of 50-seat aircraft by more than half by 2019, it says. The deal appears to end Bombardier's hopes of selling its new CS100 twinjet to the US carrier.

ASCEND RETAINS TOP APPRAISER CROWN

AWARD Flightglobal consultancy Ascend has again been voted Appraiser of the Year, taking the honours for 2016 at the Aviation 100 Awards event in Dublin, Ireland, held alongside the Airline Economics Growth Frontiers conference. Recognised in voting by more than 10,000 industry peers, the Flightglobal division retains the title for the fourth straight year, and the fifth time since 2011. Ascend's specialists in 2015 valued in excess of 60,000 aviation assets for almost 200 different clients.



The service operates around 80 examples of Sikorsky rotorcraft

REQUIREMENT DOMINIC PERRY LONDON

Two-way tussle for CH-53G successor

Luftwaffe programme to replace its heavy-lift helicopters likely to be a contest between Chinook and King Stallion

Germany is moving ahead with an acquisition programme to replace its air force's Sikorsky CH-53 heavy-lift helicopters, with the choice effectively between two types.

A key driver for Berlin's effort under its fledgling heavy transport helicopter project is the need to purchase an in-production type, rather than launch a clean-sheet development.

Maj Thomas Knäpper, Luftwaffe capability manager in charge of the programme, says only two heavy-lift helicopters meet that requirement: the Boeing CH-47F Chinook and Sikorsky's CH-53K King Stallion. "We want to buy a product already on the market. You could assume Bell Boeing would come back with the [V-22] Osprey, but it is not as big," he says.

Germany aims to take delivery of its first new helicopter in 2022, which means contract signature needs to take place in around 2018, says Knäpper. The service has defined its technical requirements, and should issue a request for proposals in about 12 months' time, he said, speaking on the sidelines of the IQPC International

Military Helicopter conference in London on 19 January.

Berlin has not indicated the size of its requirement, but it is thought to be around or slightly less than the current fleet of elderly CH-53G/GA/GS models. Flightglobal's Fleets Analyzer database records 81 of the type in active service.

As the helicopter will support special forces operations and combat search and rescue tasks, an aerial refuelling capability is required, he says. However, Germany presently has no tankers suitable for the role. Although it is a customer of the Airbus Defence & Space A400M, the tactical airlifter is unable to perform in-flight refuelling of rotorcraft.

But Knäpper believes Airbus will have to overcome the issues with its flagship turboprop. "We insist on it [in-flight refuelling], so they will have to deal with the problem over the next seven years," he says. If not, Berlin may instead have to rely on tankers from allies.

"But if we integrate the equipment in the helicopters from the beginning, it makes it cheaper than doing it later," he adds. ■



Paris pushes
for Tiger talks
THIS WEEK P10

PROGRAMME DAVID KAMINSKI-MORROW LONDON

Low-key delivery marks Neo's arrival

With German flag carrier taking its first example of re-engined narrowbody, Airbus can now begin to tackle mammoth backlog

Lufthansa's receipt of the first Airbus A320neo on 20 January begins a delivery run for an aircraft family which has notched close to 4,500 orders in five years.

Airbus is already planning to raise the monthly production rate to 60 by mid-2019, and has been examining a potential figure of 63 to cope with the backlog.

Speaking during a briefing in Paris in early January, chief operating officer for customers John Leahy said demand had vastly exceeded the airframer's expectations. "We said we saw a good market and [at launch] saw demand for 4,000 aircraft over the next 15 years," he said. "We got to 4,500 aircraft before delivering the first. That was what we were supposed to sell in 15 years."

The aircraft was launched in late 2010 when climbing fuel prices had reached \$100 per barrel.

But declining fuel costs do not



First Pratt & Whitney PW1100G-powered twinjet was handed over to Lufthansa on 20 January

appear to have slowed demand for re-engined aircraft, with Airbus having secured net orders for 850 A320neos last year.

The aircraft is designed to offer commonality with previous A320 variants, with the installation of Pratt & Whitney PW1100G or CFM International Leap-1A engines as the primary difference.

Lufthansa Group accounts for

116 jets in the A320neo-family backlog. The German mainline operator will be taking 61 A320neos and 40 A321neos, while its Swiss International Air Lines subsidiary will have 10 A320neos and five A321neos.

Lufthansa expects to receive five PW1100G-powered A320neos this year. "We are proving we, as an aviation and airline group,

are pioneers in the development and introduction of technological innovations," says chief executive Carsten Spohr.

Airbus's backlog included 3,327 A320neos at the end of last year – less one following the first delivery – as well as 1,094 of the larger A321neo. Demand for the A319neo has been substantially lower, with just 50 ordered. ■



Air force could field an
eventual 55 examples

COMBAT AIRCRAFT JAMES DREW WASHINGTON DC

Initial A-29s arrive in Afghanistan

Afghanistan's new Embraer A-29 Super Tucanos could soon make their combat debut, after four aircraft arrived at Hamid Karzai International airport in mid-January.

The US Air Force has acquired an initial 20 A-29s for the fledgling Afghan air force, as a replacement for the latter's Mil Mi-35 helicopter gunships, under the light air support programme.

Pilot training has been taking place at Moody AFB in Georgia since early 2015, and the initial

cadre graduated in December.

The small fleet will provide an important air-to-ground attack and aerial reconnaissance capability, and the turboprops can perform interdiction missions using air-to-air missiles. The Pratt & Whitney Canada PT6-powered aircraft are produced at an Embraer facility in Jacksonville, Florida, with system integration performed by Sierra Nevada.

Afghanistan could eventually acquire as many as 55 examples of the A-29. ■

FLEETS MURDO MORRISON DUBLIN

Walsh eyes used A380s but rules out new orders

IAG chief executive Willie Walsh has raised the prospect of British Airways adding "five or six" secondhand Airbus A380s to its fleet of 12 new superjumbos, while describing the type as a "fantastic" but "inflexible" aircraft.

Used A380s could, Walsh indicates, be added to the fleet of IAG-owned Spanish flag carrier Iberia. At the same time, Walsh appears to rule out converting his current seven options for new A380s, saying the price being offered by Airbus is "too expensive". He had previously indicated that he did not see room for additional A380s at BA, beyond the 12 ordered.

"We have options on A380s but we're not going to exercise them, but we are interested in leasing secondhand A380s,"

Walsh told the Airline Economics Growth Frontiers conference in Dublin on 18 January. "I believe we could look at a further five, maybe six, for British Airways, and possibly make a case for Iberia too."

He says IAG would only be interested in acquiring Rolls-Royce Trent 900-powered A380s, which means that examples leaving the fleets of Malaysia Airlines or Singapore Airlines over the next three years are the most likely sources.

Walsh says there is "no time-scale" for acquiring the additional A380s, which would likely replace Boeing 747-400s.

BA operates 10 Trent 900-powered A380s, with the final two from its original 2007 order to arrive this year. ■

See Feature P32


ROTORCRAFT DOMINIC PERRY LONDON

Paris seeks Tiger consensus

Mk3 upgrade for Airbus Helicopters attack type rests on agreeing common missile standard

France is hoping talks with the three other operators of the Airbus Helicopters Tiger attack rotorcraft can reach consensus on a common missile to form the heart of an upgrade programme to be fielded in around 2023, even as it embarks on a nearer-term package of modifications.

So far, the nation's army aviation branch has received 39 examples of the early HAP variant and 14 newer models in the more capable HAD standard, with 17 more to be delivered in 2017.

Paris will shortly begin on an enhancement programme that will from 2017 see 36 of the early-production Tigers raised to the HAD configuration, offering more powerful engines and enhanced offensive capability through the integration of Lockheed Martin AGM-114 Hellfire air-to-surface/anti-tank missiles and 68mm or 70mm rockets. This will give the service an eventual 67-strong fleet in the enhanced standard.



France intends to operate a 67-strong fleet of HAD variant

This will be followed by a further upgrade, principally to avionics and communications systems but also adding laser-guided rockets, taking it to the "Tiger Mk2" configuration.

Maj Gen Olivier de la Motte, commander of French army aviation, says the budget for the Mk2 work is allocated and the service hopes to field the enhancements in the 2018-2019 timeframe.

However, France is working with other Tiger partner nations – Australia, Germany and Spain – to define the specification for a Mk3 variant. Key to this, says de la Motte, will be a common anti-tank missile for the type.

At the IQPC Military Helicopter conference in London, de la Motte said the Mk3 upgrade had been delayed to 2023, to allow more time to reach agreement.

RESULTS
MICHAEL GUBISCH LONDON

Orders double as ATR turnover hits \$2bn mark

ATR's turnover rose 11% to \$2 billion last year, and the European turboprop manufacturer almost doubled its firm orders.

The Toulouse-based joint venture took in 76 firm gross orders versus 40 in 2014, but eight cancellations took the net order figure down to 68. Total options declined from 120 to 81. Deliveries increased by five aircraft to 88, says the manufacturer, although this was short of its 95-unit target.

Among its customers in 2015 were 12 new clients, taking the number of current or confirmed future operators to 200.

ATR chief executive Patrick de Castelbajac says he is "satisfied" with the results. "The year 2015 was good, although some campaigns in Brazil did not happen."

ATR's backlog is 260 aircraft – \$6.6 billion at list prices – nearly three years of production.

Additional reporting by Olivier Bonnassies in Paris

CONTRACTS CRAIG HOYLE MANAMA

Gulf Air confirms future fleet mix with pair of orders

Gulf Air used the opening day of the Bahrain International Air Show to confirm its future fleet mix, updating its widebody and narrowbody plans with Boeing and Airbus, respectively.

In back-to-back announcements on 21 January, the Bahraini flag carrier converted an order for 16 787-8 Dreamliners to the -9 variant. The revised Boeing contract comprises 10 firm orders and options on another six.

"The 787-9 will replace Gulf Air's current widebody fleet and provide future network expansion opportunities," the company says. Six Airbus A330-200s are currently used to operate this segment, and the same number of -300s had previously been expected to replace them.

Deliveries of the extended-range 787-9 should begin in April 2018, with the aircraft to have a 280-seat configuration, says

acting chief executive Maher Salman Al Musallam.

Noting that the carrier ordered the 787-8 in 2007-2008 – long before it set its current ambitious network expansion plan, he told *Flight International*: "Demand now is different. Gulf Air is looking for something different."

Airbus, meanwhile, will deliver 17 A321neos and 12 A320neos between June 2018 and 2023, including 10 of the latter previ-

ously ordered by the carrier. These will replace its 22 A320/321s, and offset its cancelled A330-300s. At the show, Airbus chief executive Fabrice Brégier confirmed a net gain of 13 aircraft with the customer.

Gulf Air values its 787-9 and A320/321neo orders at a combined \$7.6 billion, and says engine selections will be revealed as soon as February.

See Show Report next week



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VIEW AGENDA



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First officer flight-hours law 'distorts' market for pilots
AIR TRANSPORT P12

THIS WEEK

PROGRAMME STEPHEN TRIMBLE WASHINGTON DC

CSeries gearing up for service entry

Airframer increases production of narrowbody as flightcrews from launch customer Swiss prepare for route-proving effort

Bombardier has stepped up production of the CS100 airliner as crews from launch operator Swiss International Air Lines start flight training in Mirabel, Canada.

The first CS100 for delivery to Swiss in the second quarter is now "structurally complete", Bombardier says. The carrier's route-proving aircraft will fly to Europe in "the coming weeks", the manufacturer adds.

Bombardier resumed final assembly operations in the CSeries plant in Mirabel last August after a year-long hiatus caused by delays to the flight-test programme.

The factory is now building up production to increase output over the next five years. Bombardier expects to deliver 255-315 CSeries aircraft through to 2020.

"It's truly a spectacular sight to see the CSeries final assembly line fully stacked with production aircraft in various stages of assembly," says Bombardier Commercial Aircraft president Fred Cromer.

Although Swiss flightcrews have already started instruction, Bombardier is still working with Transport Canada to validate the training syllabus for the CS100.



Twinjet visited 35 cities during the North American route-proving phase of its certification testing

The crews must be trained in time to launch a route-proving effort in Europe ahead of entry into service. The airline programme adds to the North American route-proving phase of Bombardier's certification programme, which was completed in December after the CS100 visited 35 cities.

"We are also doing something unique to ensure that Swiss's crews will be ready at delivery and EIS," says Rob Dewar, Bombardier vice-president and general manager for the CSeries programme. "The flight crews, once trained, will operate the CS100 route-proving aircraft alongside Bombardier's own flightcrews from Swiss's main base of operations." ■

FLEET EDWARD RUSSELL WASHINGTON DC

Delta chief is fan of GTF's 'innovation'

Delta Air Lines is taking a "serious look" at the Bombardier CSeries, says chief executive Richard Anderson, citing the fuel savings offered by the narrowbody's geared-fan engines.

"At the right price it's quite a competitive airplane given the engine technology," he said during a full-year earnings call on 19 January.

The comments follow a viewing of the Pratt & Whitney PW1500G-powered CS100 and a meeting with Bombardier Commercial Aircraft president Fred Cromer in December 2015 when the aircraft visited Delta's headquarters at Atlanta Hartsfield-Jackson International airport.

"The geared turbofan engine is the biggest innovation since the [Boeing] 787," Anderson adds, referring to the use of advanced composites on the Dreamliner.

Whether Delta actually orders the CSeries is another question. In 2014 Anderson praised the Boeing 787-9 during Delta's campaign to find a replacement for its 767-300ER and 747-400 fleets.

However, it ultimately ordered Airbus A350-900s due to what many analysts think were more attractive delivery positions and better pricing.

Delta has previously acquired used aircraft to fulfil its 100-seat aircraft requirements. ■

INCIDENT

Cold fuel affected Virgin Atlantic 747 over Atlantic



The Virgin Atlantic service was flying from Las Vegas to Gatwick

Canadian investigators have revealed that a Virgin Atlantic Boeing 747-400 crew declared an urgency call to secure a lower altitude after receiving a warning over low fuel temperature during a transatlantic service.

The aircraft (G-VGAL) had been operating from Las Vegas to London Gatwick on 19 January, according to an occurrence record filed with Transport Canada.

While over the mid-Atlantic Ocean its crew requested a descent from 36,000ft after a low-temperature fuel warning was triggered.

The aircraft's flightplan originally included a cruise level of 35,000ft, but air traffic control had instructed the higher climb.

Controllers approved the descent to 35,000ft but subsequently advised that, owing to traffic, further descent could only be permitted by declaring an emergency. The crew declared a 'pan pan' urgency call and reduced altitude to 33,000ft and then 31,000ft.

Transport Canada originally indicated that the aircraft had also offset 15nm (28km) to the right of its track. It continued to Gatwick without further problems. ■

OPERATIONS MURDO MORRISON DUBLIN

First officer flight-hours law 'distorts' market for pilots

Labour shortage in USA aggravated by tighter requirements, says Republic Airways chief

US regional airlines are facing an unprecedented pilot shortage caused by a "market-distorting" rule that requires first officers to have 1,500h flying experience, maintains the chief executive of Republic Airways.

The legislation, which took effect in 2013, is the "least talked about but most significant problem facing the industry", and persuading law-makers to relax the 2013 regulation will be a priority for airlines this year, Bryan Bedford told the Airline Economics Growth Frontiers conference in Dublin on 19 January.

"Pilot labour is exceptionally scarce, but it is artificially scarce," says Bedford. "[The legislation] has dissuaded many young men and women from entering the industry, leading to a spiralling of wage rates. It is causing a distorted marketplace."

The rule – tabled in 2010 in the wake of the fatal Colgan Air Bombardier Q400 crash near Buffalo in 2009 – raised the hours requirement for first officers from 250h to 1,500h with



Indianapolis-based carrier hopes it can effect legislative change

certain exceptions, including former military pilots.

Bedford claims the regulation has had the opposite effect to that intended by lawmakers, by pushing passengers onto small turboprops and other air taxis, which can operate under less stringent Part 135 rules and are able to fill gaps in the market that are uneconomic for regional airlines.

Bedford says that to reach the 1,500h requirement, aspiring re-

gional airline pilots are working in sectors such as crop-dusting and aerial photography, "which is not great for honing the skills they will need to fly a regional jet".

Indianapolis-based Republic and other regional airlines are working hard to persuade Congress to adopt a "quality rather than quantity" view of pilot experience, adds Bedford. "We are trying to get them to rethink the law." ■

MANUFACTURING
STEPHEN TRIMBLE WASHINGTON DC

Kaman extends A330 wing panel supply contract

Kaman Aerosystems will continue supplying wing panels for the 242t, long-range version of the Airbus A330 until 2020, under a five-year contract extension.

The deal "also ensures Kaman engagement on the A330neo", the supplier says, referring to the re-engined version of the A330, now in development.

Kaman's facility in the UK currently supplies 30 carbonfibre wing panels composed of honeycomb-core sandwich material on each 242t version of the A330.

The 242t variant of the aircraft – which has range extended by 500nm (926km) – was first delivered to Delta Air Lines last May.

Kaman says the A330neo will feature 14 alternative wing panels with a "subtly" changed aerodynamic form.

Another UK operation will design and manufacture new tooling to support the slightly different shape of the panels.

"This award builds upon the companies' long-standing, 15-year working relationship on this programme," says Kaman Aerosystems president James Larwood. ■

PROGRAMME STEPHEN TRIMBLE WASHINGTON DC

Embraer energised as first metal cut for E195-E2

Embraer has started building the first parts for the E195-E2 regional jet, the largest version of the re-winged and re-engined aircraft to enter manufacturing.

The "first metal cut" milestone for the E195-E2 comes 15 months after the same event for the baseline E190-E2. Embraer is also developing a smaller variant, the E175-E2.

"With this event we begin to manufacture the first E195-E2 that will fly in 2017, with first deliveries taking place in the first half of 2019," says Embraer Commercial Aviation president and chief executive Paulo Cesar Silva.

The E195-E2 can seat up to 132 passengers in a one-class layout as a result of a fuselage stretch that allows the addition of three rows of four-abreast seats.

Embraer is now entering a period of intense manufacturing and testing of the EJet-E2 family.

The first E190-E2 is scheduled to roll-out in February at its São José dos Campos facility, followed by a first flight in the second half of 2016. The variant, which can accommodate 106 passengers in a single-class layout, is scheduled to enter service in 2018.

Its sister aircraft are due to follow at one-year intervals – the



Deliveries of the stretched twinjet are expected to begin in 2019

E195-E2 in 2019 and the E175-E2 in 2020.

All three variants are powered by new versions of the Pratt &

Whitney geared turbofan engines: the PW1900G on the E190-E2 and E195-E2 and the PW1700G on the E175-E2. ■



Transaero jets to enter Aeroflot fleet
AIR TRANSPORT P14

ANALYSIS MAX KINGSLEY-JONES LONDON

Book-to-bill fall is no cause for alarm

Despite output rising significantly above order intake at big two airframers, demand is still strong, according to analysts

Airbus and Boeing saw dramatic declines in their book-to-bill ratios last year as their combined result fell below the industry's long-term average.

Analysts expect this trend to continue in the near term but do not see it as an indicator that demand for new aircraft is softening.

Between them, Airbus and Boeing boosted output in 2015 by 3% to almost 1,400 aircraft. But their order intake declined more than a third from the all-time commercial jet record of 2,888 net orders in 2014, to 1,804 last year. While this is still a respectable tally, it is the first time that combined net orders has dropped below the 2,000-mark since 2010.

The consequence of the rising production and declining sales is a combined book-to-bill ratio of 1.3, below the long-term average of 1.6.

"We are headed below the book-to-bill average, but this is not a sign of weakening demand"

ROB MORRIS

Head of consultancy, Ascend

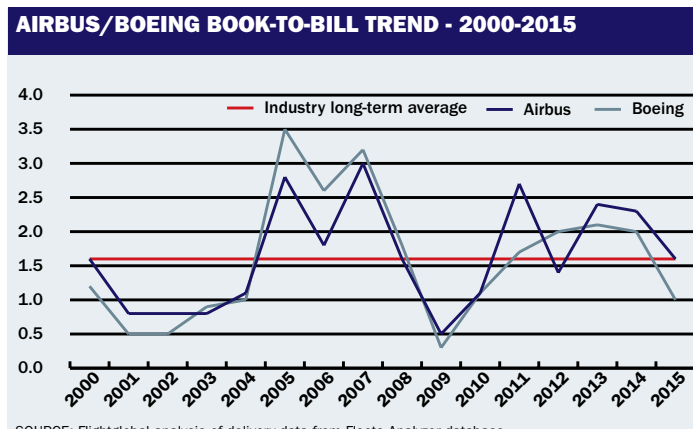
Airbus's higher order tally and lower production (1,036 net orders and 635 deliveries) gives it an order/delivery ratio of 1.6. Boeing's deliveries outstripped its rival by almost 130 aircraft (762 shipments). It matched its output with new sales, securing 768 net orders in 2015. And after four consecutive years of double-digit growth, the combined jet backlog rose by just over 3% in 2015.

STRONG BACKLOG

Rob Morris, head of consultancy at Flightglobal's Ascend analysts, says that while book-to-bill can be a strong indicator of the demand cycle, he thinks other factors are currently at play.

"Right now, we look to be headed below the long-term book-to-bill average," he says. "But let's be clear, this is not a sign of weakening demand at present. The backlog can't grow forever.

"This time around, it's probably a manifestation of the strong backlog, coupled with the fact that manufacturers have no slots to sell for many years in the future. Therefore we expect the book-to-bill to be below the long-term average at least in 2016,



and potentially for a couple more years."

In addition, there is no evidence that falling oil prices are deterring carriers from ordering new fuel-efficient aircraft, and there is little prospect of that changing even if prices stay low, argues Peter Morris, chief economist at Ascend.

Delivering an upbeat outlook for the global airline industry, Peter Morris told the Airline Economics Growth Frontiers conference in Dublin on 18 January that carriers had enjoyed a "double windfall" of a falling fuel price and "the benefit of new toys" – a slew of more-efficient

narrowbody and widebody types coming onto the market.

The year-on-year falls in order totals seen in 2015 were the result of "the first movers" having placed big orders earlier in the programmes rather than an indication of falling demand, says Morris.

"There is no strong evidence of major cancellations on the new stuff or people saying I'll run the old stuff forever," he says, noting that the commercial backlog remains at a record high. "I don't anticipate [that changing]," he adds. ■

Additional reporting by Murdo Morrison in Dublin

PROPULSION MURDO MORRISON DUBLIN

Walsh says decision imminent on A320neo engine

IAG will make an engine selection for the Airbus A320neos it has on order in the coming few weeks.

The British Airways, Aer Lingus, Iberia and Vueling parent opted for the re-engined narrowbodies in 2013 as part of a deal for up to 220 A320s.

It has gradually been firming options and Airbus's backlog data shows that, at the end of 2015, the carriers had a combined 102 A320neo-family jets on order.

IAG chief executive Willie Walsh confirmed, at the Airline Economics Global Frontiers

conference in Dublin 18 January, that the company would decide "by the end of the quarter" between the CFM International

Leap-1A and the Pratt & Whitney PW1100G.

British Airways' current-generation A320s are powered by



Aer Lingus A320-family fleet is powered by CFM56B engines

International Aero Engines V2500s, while Aer Lingus and Iberia jets are equipped with CFM56Bs, and Vueling uses both engine models.

IAG's original deal with Airbus comprised 30 A320s and 32 A320neos, plus 58 A320 options, intended for Vueling, plus a supplementary options package of 100 A320neos to be deployed across all IAG member carriers.

BA currently has firm commitments for 35 A320neo-family jets. Iberia has orders for another 20 and Vueling has 47. None has yet been allocated to Aer Lingus. ■

AIRLINES DAVID KAMINSKI-MORROW LONDON

Aeroflot plays down monopoly claims

Collapse of rival Transaero and absorption of part of operation has not given flag carrier unfair position in Russian market

The demise of Russian carrier Transaero has not led to Aeroflot unfairly dominating the national air transport sector, its chief has told Russian president Vladimir Putin.

Chief executive Vitaly Saveliev, during a meeting with the president, claims the loss of Transaero has not unbalanced the Russian market. "Aeroflot did not become a monopoly," he insists, despite its absorption of a substantial portion of Transaero.

He puts Aeroflot Group's market share at 42%, counting only Russian operators, falling to 37% when foreign operators are taken into account.

Aeroflot Group expects to start introducing aircraft from Transaero in March, says Saveliev, and has entered lease agreements with financial firms Sber-



Addition of former Transaero aircraft, including Boeing 777s, will enable summer capacity hike

bank, VTB and VEB to take over 34 former Transaero jets. The aircraft will comprise 14 Boeing 747s plus five 777s, five 767s and 10 737s.

"They are undergoing maintenance," says Saveliev. "We hope to see the first aircraft in March."

Most of the 34 aircraft will be put into service with Rossiya,

which is being combined with Orenair and Donavia. This will have a fleet of 74 aircraft.

Saveliev says that the expanded fleet will enable a 10-30% hike in capacity on routes to the far east of Russia during summer.

He confirmed to Putin that Aeroflot will complete deliveries of its 30 Sukhoi Superjet 100s

over the next four or five months and that the company is intending to increase its fleet with the acquisition of another 20 of the type.

Saveliev adds that the company has a tentative deal for 50 Irkut MC-21s – also referring to the type as the Yak-242 – and that Aeroflot hopes the aircraft will strengthen the group's operations. ■

SUPPORT MAVIS TOH SINGAPORE

Comac bolsters capabilities with flight-test facility

Comac has declared its new flight-test centre, near Dongying Shengli airport in Shandong province, ready for operations. The Chinese airframer says the facility will progressively gain its own test adjustment hangar, aprons, simulation labs and training centres, all geared towards building capability for commercial flight-test work.

The centre will primarily focus on high-risk flight-test modules for the C919 narrowbody, and the training of pilots and engineers. It will subsequently work on maintenance of the indigenous Chinese twinjet, due to make its maiden flight this year. It will also undertake flight-test work on the ARJ21.

Comac says the facility will raise its flight-test capabilities. Other proposed developments include separate maintenance, delivery and training centres. ■

PROGRAMME DAVID KAMINSKI-MORROW LONDON

Irkut MC-21 gathers momentum with delivery of first wing panel for twinjet

Russian airframer Irkut has taken delivery of the first composite wing panel for the MC-21 single-aisle twinjet.

The cover panel for the starboard wing has been developed by AeroKompozit using vacuum infusion and carbon lay-up processes.

AeroKompozit is completing work on similar panels for the port wing, says Irkut.

Irkut says it is currently installing various systems in the assembled fuselage of the initial MC-21 airframe.

Final assembly of the new Russian narrowbody is taking place in Irkutsk, with the first flight-test article set to be rolled out by mid-2016 and to make its maiden sortie late this year.

The jet will be powered by Pratt & Whitney PW1400G or Aviadvigatel PD-14 engines.

Meanwhile, Russian aerostructures supplier Aviastar has

shipped fuselage panels for the second prototype MC-21 to Irkut.

Production of the panels for the third example, and of the auxiliary power unit (APU) cover for the second, is also under way, says Aviastar.

In 2016, the Ulyanovsk-based

company will also produce the doors – 11 for each aircraft – and vertical and horizontal stabilisers for the second prototype and APU compartment for the third, it says. ■

Additional reporting by
Dominic Perry in London



Ulyanovsk-based Aviastar is producing fuselage panels for the jet



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American picks SelectCare

Shrinking 757 fleet spurs US carrier to change support package for its Rolls-Royce engines

American Airlines has become the launch customer for Rolls-Royce's new fixed-price engine overhaul scheme, SelectCare. The programme is derived from the UK manufacturer's hours-based TotalCare after-market support package.

R-R's deal with American covers a set number of overhauls for the US carrier's RB211-535 engines, which power its Boeing 757 fleet.

These were previously serviced under a TotalCare agreement, but as American is retiring the 757s, the airline has sought new terms.

Flightglobal's Fleets Analyzer database shows the airline operates 66 757-200s, down from 90 two years ago.

R-R says SelectCare sits between TotalCare and traditional, time and materials-based maintenance, repair and overhaul services. While TotalCare was designed to offer airlines maximum time on wing, predictable maintenance costs, and coverage of operational risks from technical failures, the new scheme "allows customers the services they require across an agreed number of engine-shop visits", says R-R.

Guarantees regarding time on wing and operational risk coverage become less relevant under



RB211 powerplants are covered by set number of shop visits

the scheme, while airlines can still count on cost predictability.

The risk an agreed number of visits may not be sufficient – through, for example, unscheduled maintenance – will be borne by the operator, says R-R senior vice president of strategy and marketing Richard Goodhead.

The manufacturer says services such as engine health monitoring and access to its MRO network "differentiate SelectCare from other fixed-price overhaul agreements". Goodhead says the contract with American has no definite time period and is based only on the number of shop visits.

He adds that the SelectCare programme has been developed over the past year and is predominantly aimed at operators owning the engines in question.

R-R's contract with American is not linked to the two partners' decision last year to close their joint-venture overhaul shop Texas Aero Engine Services, in Fort Worth, says Goodhead.

Citing low overhaul volumes, R-R and American disclosed in September 2015 that the facility – which supported RB211-535, Trent 800 and Tay engines – would cease operations by the end of January 2016. ■

FLEET
DAVID KAMINSKI-MORROW
LONDON

TAP continues shake-up with regional revival

Portuguese flag-carrier TAP is to establish a new regional division, TAP Express, which will operate Embraer jets and ATR turboprops. The airline is positioning TAP Express as a successor to regional subsidiary Portugalia (PGA) from the end of March.

Its fleet will be modernised to comprise nine Embraer 190s and eight ATR 72s. "With such a fleet, TAP Express will become the most efficient regional airline in Europe," says the flag-carrier.

PGA uses Embraer ERJ-145s and Fokker 100s, as well as ATR 42s, according to Flightglobal's Fleets Analyzer database.

The larger Embraers will have 110 seats, while the ATRs will have 70, says TAP, increasing the regional capacity by 47%.

PGA's fleet averages 21 years of age, it adds, and new aircraft will reduce the figure to just two years.

"The fast phase-in of aircraft will only be possible thanks to co-operation between TAP and Brazil's Azul," the company says.

TAP is majority owned by the Atlantic Gateway consortium – including Azul founder David Neeleman – which secured a 60% stake following a government privatisation in November 2015. ■

DEVELOPMENT FIRDAUS HASHIM SINGAPORE

Design freeze nears for new Indonesian turboprop

Indonesian Aerospace (IAe) is close to finalising the design configuration of the N245, a commercial variant of the Airbus Defence & Space CN235 medium transport it builds under licence.

Once the configuration is frozen, the manufacturer will proceed with windtunnel tests of a mock-up, leading to production of three prototypes by 2018, it says.

The state-owned airframer, also known as PT Dirgantara Indonesia, says that the aircraft will be designed to accommodate

45 to 50 passengers, while offering better short runway performance than the rival ATR 42.

By utilising the CN235 as the

basis for the N245, IAe believes it will be able to reduce the development cost and time needed compared with a clean-sheet design.



Military transport will form basis of passenger aircraft

Creating a commercial variant will involve re-designing the empennage to remove the cargo ramp. Several frames will be added to lengthen the fuselage, while changes to the interior are also being considered.

In addition, the N245 will utilise Pratt & Whitney Canada PW127 engines, rather than the General Electric CT7s used on the current model. These already power the larger Airbus C295.

IAe is also open to possibly offering a freighter version. ■



B-52 gets weapons bay upgrade
DEFENCE P18



Both AgustaWestland Merlins and Boeing Chinooks could be targets for in-flight refuelling upgrades

STRATEGY DOMINIC PERRY LONDON

SDSR fuels rotorcraft study

UK considering several possibilities to address extending range of transport helicopters

The UK is exploring options for its transport rotorcraft, including in-flight refuelling, as it looks to extend the operational range of its fleet in line with commitments made in a recent defence review.

Released in November, the Strategic Defence and Security Review (SDSR) promised the UK would “upgrade helicopters and transport aircraft so we can deploy further, faster and independently, to meet threats around the world”.

Speaking at the IQPC International Military Helicopter conference, Maj Gen Richard Felton, commander of the UK’s multi-service Joint Helicopter Com-

mand, said several options were on the table.

With the acquisition of a new type, such as the Bell Boeing V-22 tiltrotor, unlikely, Felton says the focus is instead on adding range to existing platforms.

This could either be achieved through the installation of internal fuel tanks – with a reduced payload the trade-off – or the addition of in-flight refuelling.

However, he concedes that consideration will also have to be given to tankers; the nation’s only in-flight refuelling assets, the Royal Air Force’s Airbus Defence & Space A330 Voyager tankers, are

unsuited to the slow speeds necessary for helicopter refuelling.

“We are thinking how we get an air-to-air refuelling capability. Have we got tankers that can do it?” Felton asks. “We might go down the route of [equipping] the aircraft, but not buy the tankers because we can use another nation’s.”

Both the RAF’s Lockheed Martin C-130J and Boeing C-17 transports can achieve the 120kt (222km/h) required, he says, stressing that the decision-making process is at a “really early stage”, and any upgrade would be confined to “specific operations and missions” rather than a fleet-wide effort. ■

MODIFICATION DOMINIC PERRY LONDON

Bell to modify V-22 prop rotor blades

Bell Helicopter will, in 2017, fly a V-22 tiltrotor equipped with new prop rotor blades designed to reduce manufacturing costs.

The modification is part of a series of trials under the manufacturer’s Advanced Technology Tiltrotor risk-reduction exercise for its US Marine Corps and US Air Force customers.

“It is a fairly substantial change to the airframe,” says Jason Hurst, senior manager of global military business at Bell, adding that the modification is designed to address the “productability” of the blade. “They perform fairly well now, but are very labour



Changes to the components are derived from work on the V-280

intensive,” he notes. The undisclosed changes have been derived from development work on the next-generation V-280, he said at IQPC’s International Military Helicopter conference in London on

18 January. Test flights of the modified component will take place in 2017-2018 from Bell’s Arlington, Texas facility, using a Block A V-22 leased from the USMC’s VMM-204 test squadron. ■

RESTRUCTURING

JAMES DREW WASHINGTON DC

US Army steps up pace of fleet retirement plan

US Army officials say the force has divested all but two of its Bell Helicopter OH-58D Kiowa Warrior squadrons under its aviation restructure initiative, which has handed over the armed aerial scout role to Textron Systems RQ-7 Shadow unmanned air vehicles.

The service is also “on track” to divest its Bell TH-67 Creek trainers, with Airbus Helicopters UH-72As supporting initial-entry rotary wing training at the army’s aviation centre in Fort Rucker, Alabama, starting from mid-January.

“The OH-58, it breaks my heart but we’ve got to do it,” said Maj Gen Michael Lundy, head of the aviation centre of excellence at Fort Rucker, during a 14 January conference. “It’s the right thing to do and we will finish divestiture here during 2016.”

“The OH-58, it breaks my heart but we’ve got to do it [divest]”

MAJ GEN MICHAEL LUNDY

Commanding general, aviation centre of excellence, Fort Rucker

Lundy says five combat aviation brigades have been reconfigured so far, with Shadow units now pairing with Boeing AH-64E Apache attack helicopters, providing unmanned surveillance, targeting and strike support via manned-unmanned teaming. The service’s efforts in 2015 laid the groundwork for developments this year, particularly as more UH-72s arrive for the training mission, and additional Shadow units are stood up.

He is also urging for the replacement of remaining A-model Sikorsky UH-60 Black Hawks in the US Army National Guard, by converting them to the L or V standard.

Lundy says the process is taking longer than hoped, mostly because of budget constraints. “It’s still going to be slower than I want; probably 2023 by the time we finish the full divestiture of that model,” he says. ■



CAPABILITY

C295 to perform 'dry contact' test of fuel rig shortly

Airbus Defence & Space's development of an air-to-air refuelling system for the C295 is moving ahead, with a "dry contact" flight test planned in 2016, ahead of a full fuel transfer trial.

The company's A400M military turboprop is late performing air-to-air refuelling operations, causing frustration among customers, with France picking the Lockheed Martin KC-130J for the capability.

Now, Airbus wants to outfit the C295 with a centreline, cabin-mounted hose-and-drogue rig for in-flight refuelling of combat helicopters. The system would be a new option for C295 operators.

"We have already performed the hose control test in the rig and we are currently preparing the hose control for in-flight [testing]," the company tells *Flight International*. "We aim to perform the dry contact flight-test with a C295W test aircraft during 2016 and then to perform the fuel transfer flight test."

If successful, the company says the technology would become available "during 2017". Airbus is already in talks with potential buyers. ■



The strategic bomber can now carry smart weapons which will help keep the type relevant to 2040

MODIFICATION JAMES DREW WASHINGTON DC

B-52 gets weapons bay upgrade

New digital rotary launcher will allow aircraft to carry guided JASSM-ER and MALD munitions

Boeing has delivered six modified rotary launchers for the US Air Force's Boeing B-52 strategic bomber, allowing the aircraft to carry GPS-guided weapons for the first time.

The new digital rotary launcher allows each B-52 to carry eight joint direct attack munitions internally, and will eventually carry the Lockheed Martin AGM-158B JASSM-ER and Raytheon ADM-160 Miniature Air Launched Decoy (MALD).

The modification turns the existing common strategic rotary launcher in the weapons bay into a conventional rotary launcher, carrying weapons internally to

help reduce drag. The January delivery follows a series of ground and flight tests, Boeing says.

That combination of MALD and JASSM-ER makes the Stratofortress a flexible combat aircraft that can destroy targets from hundreds of kilometres away and provide decoy support for formations of frontline fighters. The new launchers can be swapped between the B-52 fleet.

The upgrade comes as the air force tries to keep its remaining 76 H-model B-52s combat-relevant through 2040 as the planned Northrop Grumman long-range strike bomber enters service.

The Stratofortress has long been

praised for its capacity – it is capable of hauling 31.5t (70,000lb) of ordnance – but its guided weapons capabilities have often lagged behind modern airframes.

"The upgrades to the B-52's internal weapons bay make it possible to have zero gap on the long-range bombing capabilities as we transfer from conventional air-launched missiles to JASSM-ER," says air force B-52 programme director Col Tim Dickinson. The ability to carry more MALDs creates a new role for the B-52, as they are designed to replicate the flight path and radar signature of US combat jets to distract air defence systems. ■

EVALUATION

F-35A on target for Paveway II release milestone

In February or early March, a combat-coded F-35A from the 34th Fighter Squadron at Hill AFB will release an inert, laser-guided bomb at the nearby Utah Test and Training Range.

This, the US Air Force says, will be a "monumental achievement" for the multinational F-35 programme, which has been building to this moment since Lockheed Martin won the Joint Strike Fighter contract in 2001.

The Raytheon GBU-12 Paveway II release will be a test for the conventional A-model, which until now has only released weapons in development and op-

erational testing.

The air force's Block 3i aircraft will first operate with basic laser and GPS-guided weapons, as well as beyond-visual-range Raytheon AIM-120 air-to-air missiles. It will also have advanced target-

ing, surveillance and radar-jamming equipment. The full complement of weapons will not arrive until Block 3F in late 2017, but the armaments the F-35 does have in Block 2B and 3i can accomplish basic close air support,

air interdiction and suppression or destruction of enemy air defence missions, says the USAF.

Meanwhile, the US defence department and F-35 engine supplier Pratt & Whitney have reached a "handshake agreement" in negotiations for the production of 167 F135 turbofan engines.

The ninth and 10th low-rate initial production contracts cover 66 and 101 engines respectively, up from 36 and 48, marking a 110% jump from Lot 8 to 10. To date, P&W has delivered 262 F135s for all three variants. Lot 9 engine deliveries are to begin this year, followed by Lot 10 units in 2017. ■



Tests are set for February or early March



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COMPETITION JAMES DREW WASHINGTON DC

Field thins in Ottawa's FWSAR search

Embraer, Alenia Aermacchi and Airbus left in running for long-running requirement as Lockheed Martin declines to bid

Canada's decade-long quest to purchase a new fixed-wing search and rescue (FWSAR) aircraft has narrowed to three contenders – the Embraer KC-390, Alenia Aermacchi C-27J and Airbus Defence & Space C295W.

Alenia and Airbus both confirmed their participation to *Flight International*, while the KC-390 has also reportedly been submitted by Embraer.

Acquisition body Public Works and Government Services Canada says that just three proposals were received. Lockheed Martin says it declined to offer the C-130J.

“Following analysis of the requirements, we decided to not submit a formal response to Canada's FWSAR RFP”

LOCKHEED MARTIN

“After an extensive and thorough analysis of the request for proposal's requirements, we decided to not submit a formal response to Canada's FWSAR [request for proposals],” says the manufacturer.

Ottawa is seeking a replacement for the Royal Canadian Air Force's (RCAF) aged fleet of six de Havilland CC-115 Buffalos and 13 Lockheed CC-130Hs.

The Super Hercules had been considered a prime contender, since US Air Force and US Coast Guard HC-130Js have long been performing SAR missions. Lockheed had also participated in the early stages of the FWSAR contest as a “potential bidder”.

An evaluation process for the C\$3.1 billion (\$2.1 billion) FWSAR programme, including flight testing, will take some six months. A contract award is expected in “late 2016 or early 2017”.

The fixed-wing contest is im-



Royal Canadian Air Force

The Royal Canadian Air Force is looking to replace its six CC-115s

portant to the RCAF as it will also shape the future of its rotary-wing SAR fleet. It presently uses 14 AgustaWestland CH-149 Cormorants for the mission, with these due for a mid-life upgrade in the coming years.

However a future replacement will be needed. “It is hard to make a long-term determination of what rotary SAR is going to look like until we have the fixed-wing piece in place,” says a senior air force officer. ■

MODIFICATION ARIE EGOZI TEL AVIV

Israeli stiffens strike backbone with F-15I upgrade

Israel will embark on a “deep” upgrade of its Boeing F-15I Ra'am fleet as it looks to maintain the type as the backbone of its air force's strike capability, despite the parallel acquisition of the Lockheed Martin F-35.

Modifications will include structural changes, the addition of an active electronically-scanned array radar, updated avionics and new, unspecified weapon systems.

A selection process for the radar is ongoing, with a decision

due mid-year. It is thought Israel favours the Raytheon APG-82(V)1 radar selected by the US Air Force for its F-15Es.

Lt Col Yiftach, head of the Israeli air force's aircraft branch, says that although some missions will eventually pass to the F-35, the Boeing type will remain a “strategic aircraft”.

“When we want to reach far distances with few aircraft and many arms – the F-15I wins,” Yiftach says, noting its “great carrying abilities”.

Flightglobal's Fleets Analyzer database records the service as operating 25 F-15Is, along with a combined 42 A/C-models.

Work to install additional systems on the first of the air force's C-130J tactical transports, meanwhile, began in mid-January at Lockheed's facility in Greenville, South Carolina.

Most of the new equipment has been developed in Israel, and is aimed at allowing the C-130J Samson to operate within the Israeli defence forces' Depth Com-

mand, tasked with performing long-range missions.

The first Israeli aircraft will remain in the USA for four months, with a second to be flown to Greenville following the lead example's return. The Israeli air force's third C-130J – delivered in 2015 – had the additional systems installed prior to its transfer.

Fleets Analyzer shows a fourth C-130J as being on order for the service, with letters of intent signed for another three, and options on two further examples. ■

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PERSONAL JETS KATE SARSFIELD LONDON

Cirrus focuses on certificated Vision

World's first single-engined personal jet nears service entry as airframer eyes production ramp-up to 100 per year by 2017

Cirrus Aircraft's Vision SF50 is entering the final stages of its nine-year certification effort, as the US airframer targets mid-2016 for validation and service entry of the world's first single-engined personal jet.

The certification timetable has been pushed back by around six months. Cirrus attributes this to unavoidable hitches with the flight-test process. "It's a brand-new aircraft," says SF50 programme manager Matthew Bergwall. "It's also Cirrus's first jet, so there are bound to be a few setbacks when you are producing a high-quality product."

The Duluth, Minnesota-based airframer and producer of the SR piston-single series has been developing the Williams International FJ33-5A-powered V-tailed jet since 2007. The programme was accelerated in 2011, following its acquisition by Chinese general aviation aircraft company CAIGA, which



Three test aircraft have amassed more than 1,000 flight hours

has committed \$100 million to bring the SF50 to market.

"Maybe the revised certification schedule was a little too ambitious," Bergwall concedes. "But we are on the home straight now, and will be the first to market with a certificated personal jet."

The company's three production-conforming aircraft have completed more than 1,000h of

flight testing since the first example took to the sky in March 2014, and the US Federal Aviation Administration has now begun in-flight evaluation of the \$1.96 million, six-seat type.

In February, Cirrus will begin in-flight deployment of the SF50's ballistic aircraft parachute system on test aircraft C-1. Load-bearing tests have already been

carried out on the parachute using weights equivalent to that of the aircraft, says Bergwall, but an in-flight deployment is necessary to secure certification.

Cirrus has firm orders for more than 550 SF50s, around 80% of which are present and former owners of the SR-series.

The company plans to deliver the first aircraft in the second half of this year. "We expect to produce 50 units within 12 months of certification and ramp up to 100 aircraft by mid-2017," Bergwall says. Around 5% of early position holders are selling their slots, he says, "mainly due to a change in personal circumstances".

Most orders are for US-based owners, with around 15% destined for Europe. "We will step up sales and marketing [in Europe] once the SF50 has secured validation from EASA," Bergwall adds. "We expect this around six months after US approval." ■

COMPLETIONS
KATE SARSFIELD LONDON

Fourth hangar widens scope for AMAC site

Maintenance and interiors specialist AMAC Aerospace has opened a fourth hangar at its base in Basel, Switzerland.

The 7,280m² (78,400ft²) hangar took nearly a year to build, and will be dedicated to widebody maintenance and completions.

AMAC says the structure is designed to accommodate at least one widebody aircraft, such as a Boeing BBJ 747, 787 or an Airbus ACJ340, along with two narrow-body airliners, such those from the ACJ320 family.

Since its launch in 2007, AMAC has grown into the largest privately-owned VIP completions company in the world. Today it occupies 85,000m² at the Euroairport site. ■

CHARTER KATE SARSFIELD LONDON

Aeris Aviation hails Channel Islands as 'perfect base' for VLJ air-taxi fleet

Aeris Aviation, the independent European distributor and broker for the Eclipse Aerospace very light jet (VLJ) family, is preparing to launch an air-taxi service in May with a fleet of managed EA500s.

The company, branded Channel Jets, will be the only operator offering the six-seat twin for charter on the continent – home to 20 privately-owned examples of the VLJ.

Channel Jets will be based in the Channel Islands and the EA500s will be registered on Guernsey's 2-prefix aircraft registry. The British crown dependency launched the service in 2013 for privately-owned aircraft, but widened the offering in December last year to commercial operators.

"The Channel Islands are a perfect base for this service," says Aeris founder and chief executive David Hayman.

Pointing to the area's thriving community of businesses and high-net-worth individuals, he says: "There is a demand for high-speed, flexible and convenient travel from the islands direct to key financial and business centres such as Geneva, Edinburgh, Dublin and Luxembourg."

"We plan to fill a niche between the super-flexible first-class airline fare and a charter flight on an entry-level jet such as the Embraer Phenom 100."

Registering the Channel Jets fleet on the Guernsey register also has its advantages, Hayman says. "Guernsey does not come under EASA's jurisdiction, so we can

operate our aircraft with a single pilot. While this type of service is the norm in the USA, it is not allowed under EASA rules, which makes the cost of operation so much more expensive."

Channel Jets will begin operations in the second quarter with two four-passenger EA500s. "We plan to have five aircraft in the fleet by the end of the year, including a couple of Beechcraft King Air 200s," says Hayman. "The twin-engined turboprops not only have a bigger cabin [than the EA500], but they can also operate from short runways, which gives us even more flexibility."

All the aircraft will be managed by Channel Jets through a dry lease arrangement with their owners. ■



Will 'Moon village'
plan materialise?
NEWS FOCUS P23



Equity sale will allow the Kodiak manufacturer to expand its share of the global utility aircraft market

FUNDING KATE SANSFIELD LONDON

Mitsui buys stake in Quest

Sale of 12.5% share in turboprop maker secures more than \$10m to increase its portfolio

Quest Aircraft parent Setouchi Holdings has sold a 12.5% stake in the Kodiak single-engined turboprop manufacturer to fellow Japanese company Mitsui.

The equity sale gives Quest, based in Sandpoint, Idaho, more than \$10 million to help it expand its product portfolio and increase its share of the global utility aircraft market.

"This investment is great news for Quest," says company chief executive Sam Hill. "We are an ambitious company and our outlook is shared by our owners."

He declines to be drawn on the number or designs of future products, however, nor will he reveal a

timescale for their launch. "All I can say is that we will be staying in the utility sector as there is so much potential here," he says. "We are evaluating the market and talking to owners and operators within this large niche."

Hill says trading conditions in the turboprop sector are challenging due to the weak global economy and strong US dollar. "This is hitting us hard in Europe and South America, but we are making inroads into other regions such as Africa, Asia and the Middle East," he says.

Despite this harsh economic environment, Quest delivered more Kodiaks in 2015 than in the previous year. "We shipped 32 air-

craft – two more than in 2014," says Hill. "We hope 2016 will be better still."

He attributes Quest's performance to a tougher sales strategy, which the company initiated following its takeover by Setouchi in February 2015. "The business plan was revamped to be more aggressive," Hill says.

The approach seems to be paying off, as Hill says Quest has contracts in place for 42 Kodiaks this year.

To accommodate its long-term growth, the company is extending its Sandpoint headquarters by 6,970m² (75,000ft²), and is mulling a second production line outside the US. "It's too early to say where that might be," says Hill. ■

PROPULSION
KATE SANSFIELD LONDON

GE picks Prague to develop new turboprop family

GE Aviation has confirmed it will build its new advanced turboprop (ATP) engine family at a new facility it will construct on its existing site in Prague, in the Czech Republic.

The US-headquartered manufacturer had previously said it would create the "centre of excellence" in Europe, but had not specified the location.

However, with it already having an industrial presence in the Czech Republic, the Central European country was always the favourite to land the investment.

The facility will be built on a new site at GE's current engineering and production facility in Prague, the former Walter Aircraft Engines business that it acquired in 2008.

When it opens in 2020, the operation will be dedicated to the development, testing and manufacture of turboprops in the 1,000-2,000shp (735-1, 500kW) -class range, says GE.

The ATP line-up includes the 1,300shp GE93 engine that will power Textron Aviation's in-development turboprop-single. The programme is expected to be formally launched at this July's AirVenture show in Oshkosh, Wisconsin.

The GE93 will feature electronic engine and propeller controls, a class-leading 16:1 pressure ratio, and will burn 20% less fuel than current-generation models, says GE.

The US company entered the small turboprop market in 2008 following its acquisition of Walter, the Czech developer of the M601 engine, which is the predecessor of the current H-series powerplants.

GE says while the new facility is being constructed, initial work on the ATP family will be carried out at its other operations in Europe – including Prague and Avio Aero in Italy. Engine testing is scheduled to begin in 2018. ■

RIDE-SHARING STEPHEN TRIMBLE WASHINGTON DC

Airbus start-up to join forces with Uber

An Airbus innovation start-up in Silicon Valley and ride-sharing service Uber will supply helicopters for a new on-demand transportation service, Airbus Group chief executive Tom Enders announced on 17 January.

A3, an Airbus-sponsored venture capital fund and innovation centre founded in 2015, is working with an unnamed operator to provide Airbus Helicopters H125 and H130 light singles to the Uber

collaboration for the Sundance Film Festival in Utah.

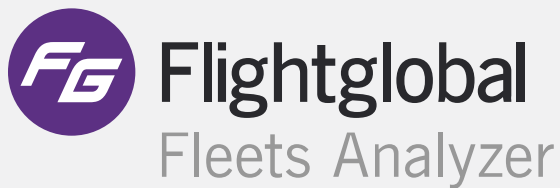
The goal is "proving out a new business model for helicopter operators to access a broader customer base", Airbus says.

On-demand helicopter transportation has been gaining momentum in several markets. In New York City, Gotham Air and Blade compete to offer helicopter flights on a per-seat basis.

Uber has previously used heli-

copter rides in several promotions around the world, in which the on-demand car service partners with local helicopter operators to offer rides during special events.

Airbus also announced on 17 January its investment in US car builder Local Motors, which relies on a global network of micro-factories to produce its designs. Airbus's investment will see Local Motors set-up a similar venture in Germany to focus on aerospace. ■



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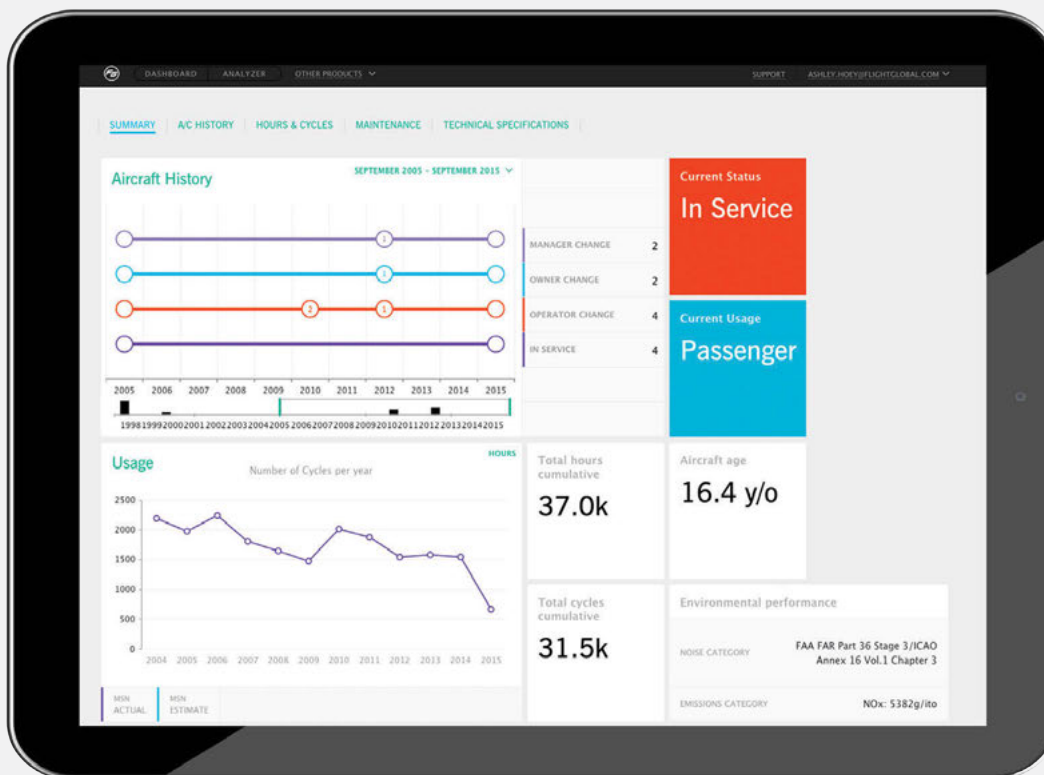


Illustration shows conceptual data only



Plead for speed
FEATURES P23

SPACEFLIGHT DAN THISDELL PARIS

Destination Moon: bold step, in reach

The International Space Station programme has a decade to run; now is the time to ask seriously, “what next?”

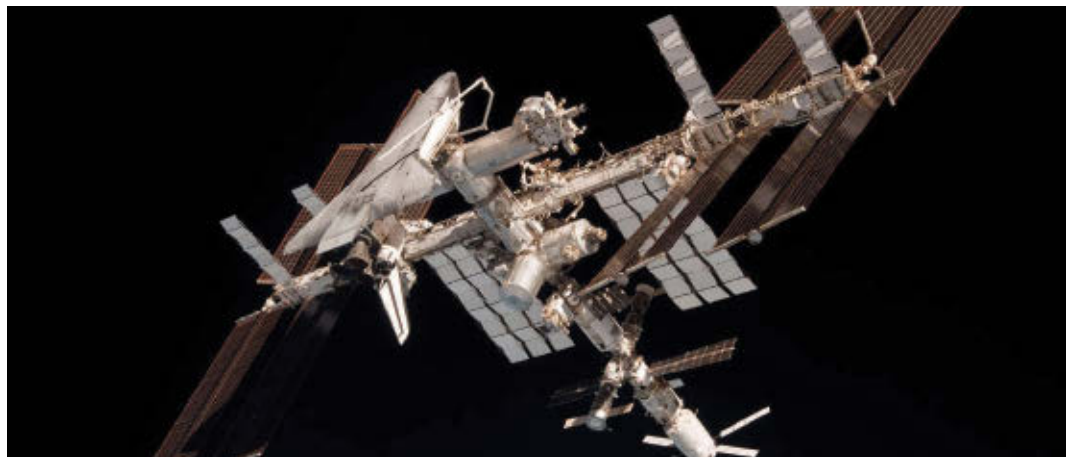
When Jan Woerner took his seat at European Space Agency headquarters in Paris for his first-ever January press conference as director general, the former head of Germany's DLR aerospace agency had plenty of good news to talk about.

In 2015, ESA's technically stunning Rosetta comet-chasing mission was a highlight by any standard, while a string of European astronauts strutted their stuff on the International Space Station and ESA delivered to NASA a test version of the service module it is supplying for the USA's in-development deep space crew capsule, Orion.

The first of two ESA-Roscosmos landing missions to Mars will launch in March, and development continues of the closely-aligned Ariane 6 and Vega C launchers. Critically, ESA members will make a decision about whether to stick with the ISS to 2024 when the outpost – originally slated for deorbiting in 2018 – will be retired. The other ISS partners – NASA, Roscosmos and Japan's JAXA – have signed up for 2024; and Woerner betrays no anxiety Europe might walk away in 2020. After all, he notes, good science is done on board and the big investments in building the station have been made.

What really motivates Woerner is the question: what comes after the ISS? Woerner's answer is a “Moon village”, and forget images of cafes and a church. The term is chosen carefully, he says, to suggest a place where people come together. By establishing some sort of permanent base, he says, any of the world's 60 spacefaring countries could participate however they wish, in line with their capabilities and objectives.

The Moon has long been a Woerner theme; he raised the idea when head of DLR. But for now, his Moon plan is mostly vision; there are no specifics in terms of missions and hardware, and no money. None of the big-budget



For spacefaring nations, what lies beyond ISS?

ESA member states have perked up. The US Federal Aviation Administration's commercial space transportation committee wants to talk to ESA, but NASA is not interested in returning to the Moon, which it considers a distraction from its 2030s objective of a crewed mission to Mars.

SOMETHING NEW

So is Woerner barking at the Moon? Not necessarily. Mars may prove unreachable, at least as soon as the 2030s. The ISS may be extendable beyond 2024 from an engineering point of view, but that is probably the political limit of an expensive scheme; flying there, doing a spacewalk or two to fix things, messing about with laboratory equipment and making a video about how the toilets work have all, if we are honest (and to the great credit of the engineers, scientists and astronauts), become part of the news wallpaper.

The scientific value of a Moon base, on the other hand, may capture public imaginations. As ESA outlines in its January 2016 “Destination Moon” video, a base on the lunar south pole opens some genuine new horizons. All of the lunar landing sites to date have been broadly equatorial and on the near side. But some south polar sites are in permanent darkness, which means they are very, very cold and believed to

The Moon is not as interesting to science as Mars, but it is in reach even if Mars is a step too far

harbour vast quantities of water ice. That ice could, in situ, be made into rocket fuel for journeys to deeper space. And, from the lunar south pole there is easy access to far-side sites over the horizon – perfect for telescope observation of the cosmos, free of the Earth's light and radio interference. The Moon is not as interesting to science as Mars, but it is reachable today and has merit – whether or not Mars is ever a practical destination.

Whether or not the community of spacefaring nations ultimately embraces the Moon village idea, ESA is in good shape with hardware and technology.

The Orion service module is based on ESA's Automated Transfer Vehicle ISS robotic resupply ships. ATV's thrusters have been shown to be ideal for gently dropping a lander on the Moon. And for at least five years, ESA has been working out details of a south pole Moon landing. At one point pencilled in for 2018, that mission may become a joint

project with Roscosmos, as soon as 2020.

Separately, NASA gave ESA a boost in January with its selection of Sierra Nevada's (SNC) in-development Dreamchaser small spaceplane as an ISS resupply vehicle from 2019.

Dreamchaser looked doomed a couple years ago when NASA failed to choose its manned version for low Earth orbit crew missions from 2018, but SNC pressed ahead, reaching agreement with ESA to combine forces on re-entry technology development, and to work to launch the craft atop Ariane 5 rockets from ESA's spaceport in French Guyana.

CHASING DREAMS

And, adds Woerner, a new folding-wing design has erased concerns Dreamchaser would not fit inside an Ariane faring – and the configuration will work for crewed or uncrewed launches. Dreamchaser cannot reach the Moon. But Ariane 6 development plans include capability for distributed launch operations. Crews and spacecraft, payloads and fuel, would be delivered to low Earth orbit for assembly and launch to deep space. Vision, persistence and its European instinct for collaboration, it seems, have put ESA in prime position – wherever humankind chooses next to boldly go. ■

The Lockheed concept is a 100-seat-class trijet design



PLEAD FOR SPEED

Wind tunnel testing of two advanced designs has led NASA to conclude it can deliver supersonic flight, and reduce tell-tale boom

STEPHEN TRIMBLE WASHINGTON DC

Back in 2012, NASA thought it had reached a breakthrough in a decades-long quest to design a “low-boom” supersonic aircraft. With leftover funding from the 2009 financial stimulus act, the agency commissioned Lockheed Martin and Boeing to separately develop preliminary designs and wind tunnel models of aircraft concepts.

Lockheed aimed its efforts at a 100-seat-class trijet design similar in scale to the four-engined Aerospatiale-BAC Concorde, while Boeing focused on a smaller, 70-seater with uniquely-configured over-the-wing-mounted engines. Four years later, Lockheed and Boeing have reported back to NASA, with windtunnel runs and simulation data appearing to have validated the agency’s calculations. NASA may have reached a pivotal moment in the quest to revive commercial supersonic air travel, more than 12 years after Concorde was retired from service by Air France and British Airways.

Indeed, the data served to persuade the superiors of Peter Coen – head of the high-

speed project in NASA’s aeronautics research directorate – to authorise a feasibility study for a new supersonic X-plane that could verify the wind tunnel results in real flight. Critically, data from flight testing could, finally, force international regulators to consider overturning a 47-year-old ban on breaking the sound barrier over land.

Coen says: “We’re very pleased with [Lockheed’s and Boeing’s] results. Lo and behold, we feel there is a solution using a scaled X-plane – a 100ft-long aircraft that weighs about 25,000lb, which is capable of replicating the acoustic characteristics of a boom of a larger airplane up to 300,000lb or so.”

A final funding decision may come in February, with the Obama administration’s fiscal year 2017 budget request. If the programme is launched, Coen expects to have a detailed design study complete by the end of FY2017, followed by a first flight of the supersonic X-plane in FY2019.

EXPERIMENTAL VEHICLE

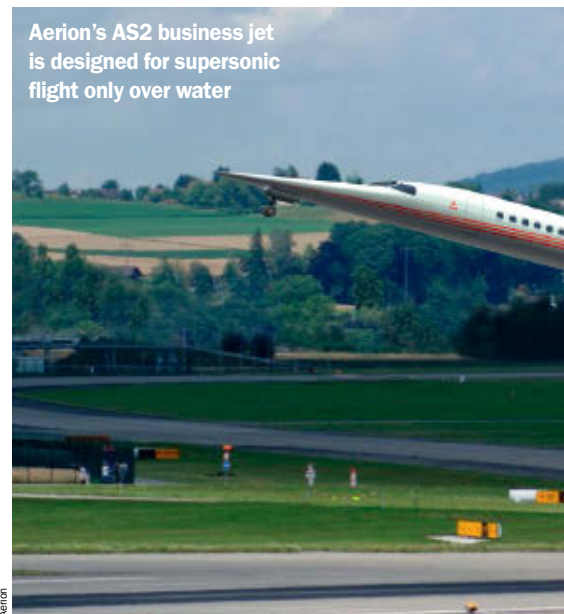
This low-boom experimental vehicle would be used in an effort to rewrite the rulebook on flying over land at supersonic speed. Of course, not everyone agrees such an effort is necessary. Aerion, which has partnered with Airbus, is developing the AS2 business jet to be optimised to fly at supersonic speeds over water but cruise at high-subsonic speeds over land in the USA and potentially up to Mach 1.1 in Europe, where regulations are slightly less restrictive.

But NASA officials and others in the industry, including Gulfstream, have said a

commercial supersonic aircraft is only viable economically if it can fly at top speed over land. To make that happen, someone has to give the regulators a reason to change the rules. The Lockheed and Boeing study results indicate new technology can reduce sonic boom noise from 105PLdB to as low as 75PLdB, Coen says.

But while ICAO’s committee on aviation environmental protection (CAEP) has established a supersonic transport task group, it will need more than NASA-funded windtunnel studies – no rules can be changed without real flight data from a representative aircraft and a public response.

Aerion’s AS2 business jet is designed for supersonic flight only over water



“CAEP has essentially said there is no possibility of having a standard without community overflight data to validate the metrics that would be used for response, and to develop the procedures that would be used for certification,” he says. “There’s clearly a need for a flight demonstration. That’s why the NASA work has been moving in that direction for the past three years.”

“There’s a need for a flight demonstration, that’s why NASA is moving towards that”

PETER COEN

Head, high-speed project, NASA aeronautics research

If NASA headquarters approves, Coen intends his agency will deliver that data over several years. The X-plane will need all of 2020 to clear the flight envelope for supersonic testing over a carefully instrumented range spread over Edwards AFB in the California desert. Then, beginning in 2021, NASA plans to carry out a demographically broad community noise survey, beginning in Southern California, before deploying the X-plane to other US locations and, ideally, overseas.

This next step requires reviving memories of Operation Bongo II, a 1964 experiment during which the US Federal Aviation Administration selected Oklahoma City to perform a series of supersonic acoustic surveys. In fact, the agency carried out more than 1,200 sonic booms over the city over six months to measure how the population would react. After breaking hundreds of windows of downtown buildings, the agency was flooded with complaints and halted the tests prematurely.

Boeing’s concept, upside down in the wind tunnel, opts for over-wing engines



The outcry came against the backdrop of a wider public backlash in the USA against the damage and annoyance caused by sonic booms as supersonic fighters became the backbone of the US Air Force fleet. The military received nearly 39,000 claims for damages caused by sonic booms between 1956 and 1968, according to a NASA book published in 2013 called *Quieting the Boom*.

PROHIBITION ERROR

The public backlash prompted the FAA to issue a regulation in 1969 prohibiting supersonic flight over populated areas, a stricter regulation than adopted in Europe, where only making an audible sonic boom is outlawed. Public anger would also play a role

in a decision by Congress to cancel the Boeing 2707 supersonic transport (SST) programme in 1971.

By then the aeronautics industry was well aware of what needed to be done. Two NASA scientists, Richard Seabass and Albert George, had by 1969 developed the basic mathematics for relating aircraft size and shape to sonic boom noise. It would still take decades to transfer the mathematical theory into even experimental flying aircraft, but their work gave aerodynamicists tools for shaping an aircraft with sonic boom noise as a predictable and primary requirement at design stage.

As Concorde was heading towards a retirement date in 2003, NASA finally began applying those formulae to a flying vehicle. The shaped sonic boom demonstration (SSBD) in 2003 used a Northrop F-5E with a heavily modified forward fuselage, sculpted to muffle the double-thumb signature of a sonic boom.

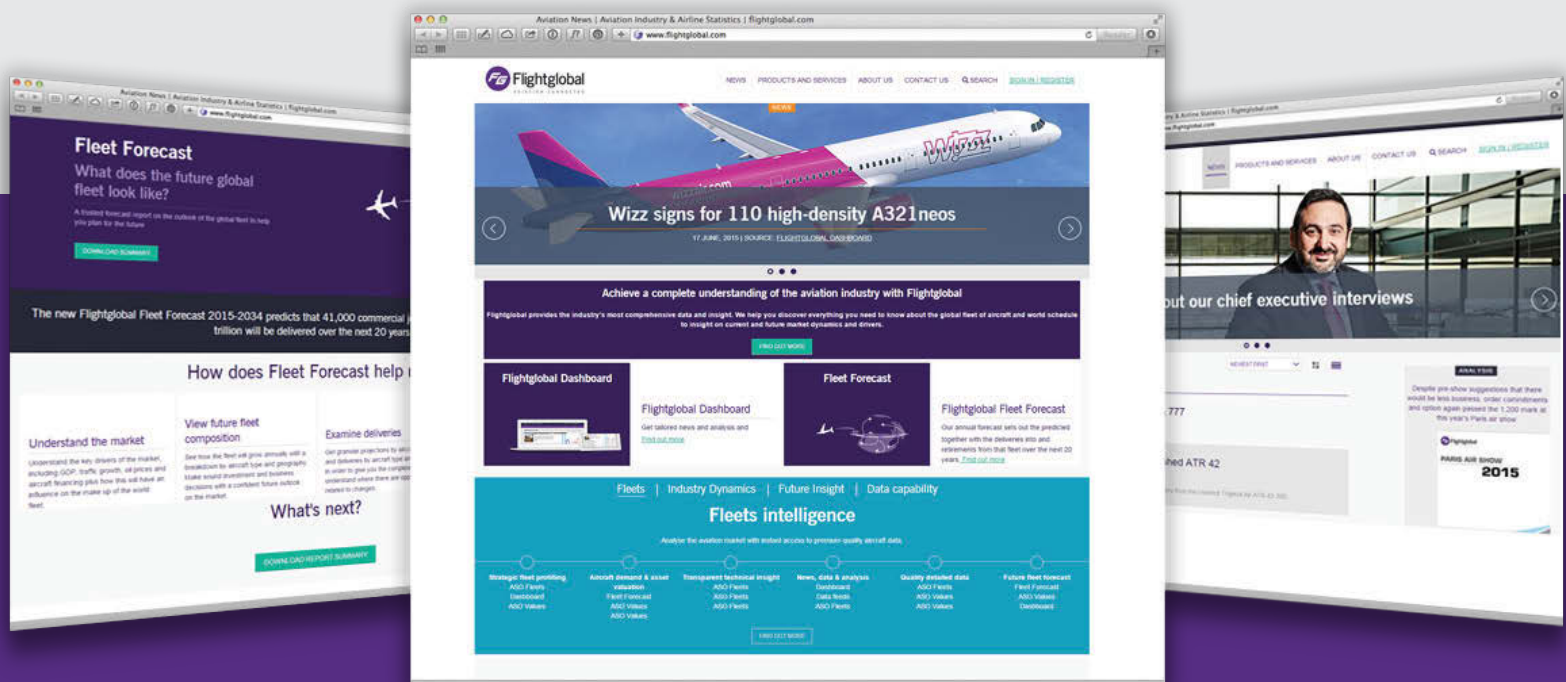
The SSBD programme succeeded in demonstrating that aircraft shaping can reduce the pressure rise of the supersonic shockwave, thus muffling the boom signature. But it also proved, as expected, that more than the forward fuselage would have to be sculpted. In fact, new software-based design tools were needed to optimise the shaping of the forward and aft structures to achieve the lowest boom signature. At the same time, NASA’s aerodynamicists also needed to solve what was then called the “low-boom, low-drag paradox”; shapes that reduce the sonic boom also increase drag. Achieving a “low-boom” noise profile might, then, gain regulatory approval – but result in an aircraft so inefficient as to be unmarketable.

Another consideration is the human ear’s



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NASA's 2003 activity with a modified Northrop F-5E showed that an aircraft's shape could muffle its sonic boom

» tolerance for sonic booms. NASA used a Boeing F-15A test aircraft to break the sound barrier over a range and measure human responses to the noise. The agency also created a ground-based acoustic chamber to replicate the same noise signature in a controlled environment, leading to a determination of the range of tolerable noise for the human ear.

"It's somewhere between 70-80PLdB," Coen says. That roughly compares to the noise made by a passing car as heard from inside a building, versus the explosive cracks of the Concorde's unmuffled double-boom.

To justify the investment of an X-plane programme, NASA wanted proof modern airframe design tools and propulsion systems could achieve those goals. So-called Phase 2 reports submitted by Lockheed and Boeing recently helped Coen make that case.

MOVING ON

More than 45 years after the first flight of Concorde, aviation technology has clearly progressed. Lockheed's Model 1044-2 is almost a direct comparison to the payload of that 100-seat pioneer. As Lockheed reports,

"If I could point to anything that was a challenge, it was community noise"

PETER COEN

Head, high-speed project, NASA aeronautics research

the 1044-2 should fly about 40% farther than the 3,900nm (7,200km)-range Concorde, but its maximum take-off weight is expected to be 14% less than the 185,000kg (408,000lb) mass of the Anglo-French jet. NASA targeted a 300% improvement in fuel efficiency per passenger mile per gallon, but achieved a 250% improvement with the Lockheed and Boeing designs, Coen says. Most importantly, the Lockheed and Boeing designs fall within the perceived noise range NASA is targeting.

Both companies were allowed to use technologies that are likely to become available in the next decade. For Lockheed's 1044-2 model, this allowed designers to switch to a relaxed compression and bleedless engine inlet that improved fuel performance, especially compared to the heavy and complex

bleed inlet designs developed for Concorde's Rolls-Royce Olympus engines.

Moreover, the 1044-2 also would benefit greatly from two major advances in propulsion technology. The conceptual supersonic airliner would be powered by three engines, each using a GE Aviation-supplied variable cycle engine. Developed under the US Air Force's versatile advanced aircraft turbine engine programme, the engine opens a third stream of airflow during take-off to increase bypass airflow, thus reducing noise. At the same time, the other two flow streams would be reversed compared to a typical turbine; rather than bypass flow surrounding the air flowing through the engine core, the 1044-2's engines would have their core section on the exterior, with bypass flow streaming through the centre.

"Essentially, that milks every decibel out of the jet you can," Coen says. "You wind up with a fairly low speed subsonic jet where you bring the jet noise down to where it's substantially below the requirement."

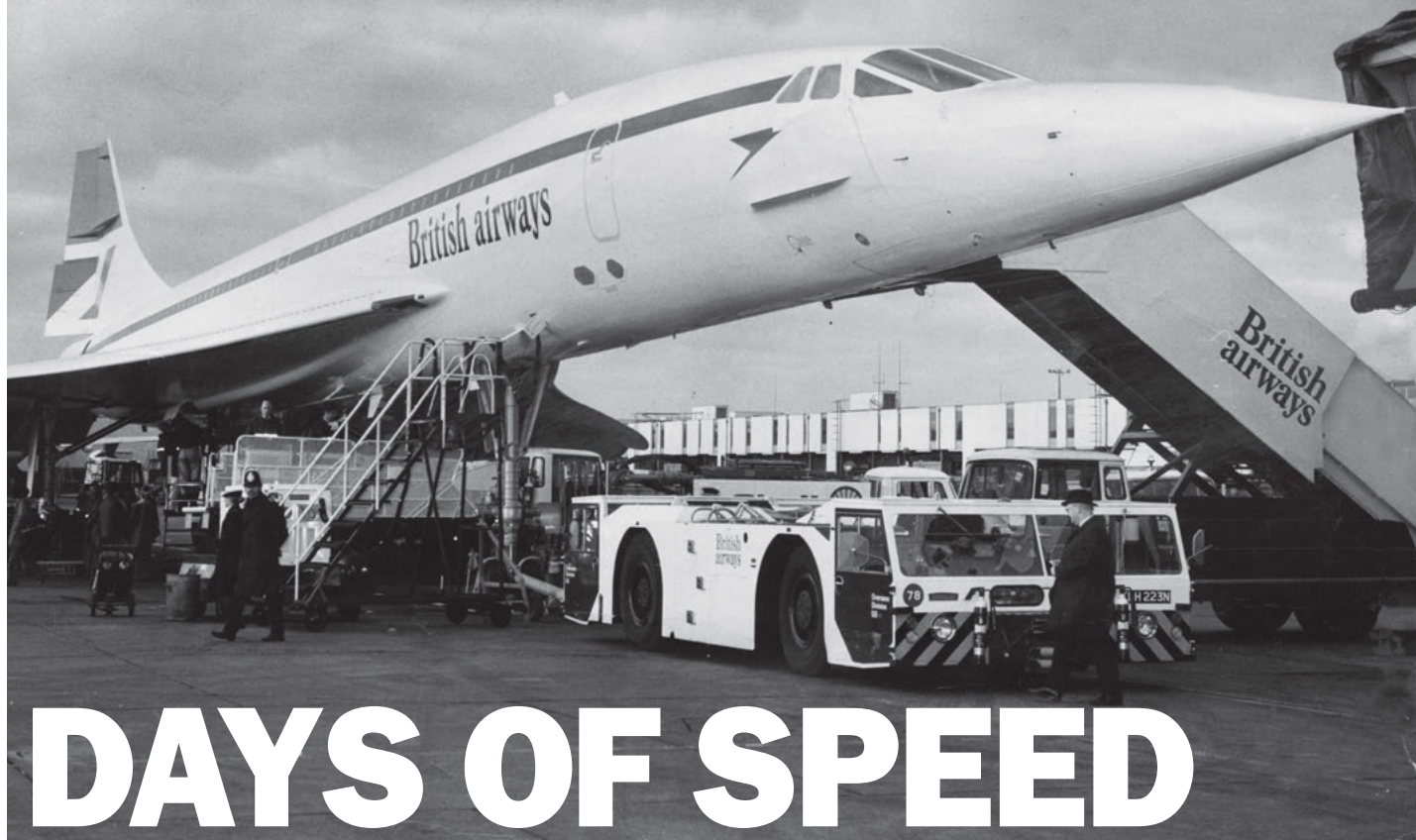
There are still many hurdles to realising quiet supersonic propulsion. One of Coen's team's biggest concerns remains meeting community noise levels for take-offs at airports, which are set to get tighter after 2021. Supersonic aircraft generally require low-bypass ratio engines, which lack the built-in noise mufflers provided by high-bypass systems. Opening a third stream of airflow helps, but may not solve the problem.

"If I could point to anything that was a challenge, it was community noise," notes Coen. Pushing propulsion and nozzle technology very hard has achieved a great amount, he says, but going to such technical extremes "kind of says to us that that's an area where more effort is needed to try and come up with simpler solutions that can give us more margin." ■



The third engine on Lockheed Martin's 1044-2 concept rides on top of the aircraft

Back to the future: Concorde's introduction involved simultaneous take-offs from Paris and London in January 1976



Howard/Library/REX/Shutterstock

DAYS OF SPEED

Almost exactly 40 years ago, Concorde made its commercial debut, with synchronised departures from Heathrow and Charles de Gaulle. *Flight International's* then-editor, Mike Ramsden, was on board the British Airways inaugural service to Bahrain

MURDO MORRISON LONDON

As a commercial venture, Concorde was a several-billion dollar failure. Between its introduction in 1976 and retirement 27 years later, the world's sole in-service supersonic airliner was only ever flown – as a loss-leader – by the national airlines of the two countries that led its development. Yet as a technological triumph and icon of aviation, it has never been surpassed, delivering the gift of time to travellers who could afford it, and the sort of globe-trotting glamour that had not been seen since the early days of the jet age, and which has arguably never returned.

In the late morning of 21 January 1976, twin British Aerospace/Aérospatiale Concorde – British Airways' G-BOAA and F-BVFA of Air France – lined up at London Heathrow and Paris Charles de Gaulle, poised for simultaneous take-offs on inaugural flights to Bahrain and Rio de Janeiro (via Dakar), respectively. Hopes were high that these sleek, revolutionary machines – the zenith of British and

French aerospace achievement – represented a new era in air transport, for those who could afford the fares at least, and would be – albeit slowly – accepted by governments and blue-chip flag-carriers around the world.

"Europe opened the supersonic age with a Houston-style countdown and a precision double launch that was technically and diplomatically immaculate," wrote *Flight International's* then-editor Mike Ramsden,

"Europe opened the supersonic age with a Houston-style countdown"

MIKE RAMSDEN

Former editor, *Flight International*

who was seated in the seventh row starboard window seat as one of a number of journalists invited to experience the BA inaugural.

It was 11:35 in London and, as G-BOAA's Rolls-Royce Olympus engines began to roar into life, he reported: "Capt Norman Todd, com-

mander, Capt Brian Calvert and senior engineer officer John Lidiard are about to halve the size of the world at the same instant as Capt Pierre Dudal and his crew, Rio-bound out of Paris."

As the clock ticked down for the Concorde's synchronised departures at 11.38, Ramsden had spotted three Boeing 747s, three 707s and three Hawker Siddeley Tridents waiting at their Runway 28L holding point. "Our countdown is for their era too," he remarked poignantly.

In an indication of how much of a political event the inaugural flights were, Ramsden described the choreography involved. If either aircraft hit a snag before take-off, the other commander was instructed to hold back. However, once the Olympuses began ramping up, any further delay would have been down to the captains' discretion.

As it happened, the departures were stage-managed to perfection. Co-ordinated by London and Paris control towers – linked by radio – both aircraft began to roll at 11.40 before lifting off 35sec later, to the delight of crowds lining the perimeter of both airports.

The director of Concorde at the Department of Industry – such was the importance of the programme to the UK government that Concorde had its own senior mandarin – marked the moment with Churchillian rhetoric, intoning as the wheels left the ground: “It is the end of the beginning.”

CRUISING SPEED

The first 1h 19min of Ramsden’s flight was unremarkable, with G-BOAA taking off to the west before heading towards Venice and assuming a cruising speed of Mach 0.93 at 25,000ft. Then, with the Alps in view, came the moment passengers had been waiting for; at 12.59 the captain announced the start of transonic acceleration.

“The surge is noticeable but I cannot detect, from where I am riding, the expected nudge of the reheat,” wrote Ramsden. “Noise level, or rather pitch, increases slightly and the now livelier airframe tells us that Concorde is in her supersonic element.”

There were some 100 passengers on board the flight, including 30 who paid and 60 journalists, aviation executives and VIPs, including two of the fathers of Concorde: Sir George Edwards, head of the BAC aircraft division in the 1960s and subsequently retired, and Sir Stanley Hooker, who led the development of the Olympus at Bristol Aero Engines.

As the aircraft powered towards its destination over eastern European and Middle Eastern countries that had given the green light to supersonic overflights, Ramsden pondered the commercial implications of the “world’s mightiest power”, the USA, banning Concorde.

Concorde arrived as scheduled in Bahrain after 3h 38min, but as there were no seats on the return flight, Ramsden and other journal-



The Air France first flight lands at Rio de Janeiro



How we reported the double inauguration in 1976

ists flew back on a 747. “What a difference,” he remarked on the contrast between the spacious interior of the jumbo and the confined cabin of the Concorde: “The broad expanse of carpet, the staircase, the table with chrysan-

“The appeal isn’t so much ‘speed, speed, speed’. Most people are nervous of speed”

MIKE RAMSDEN

themums, the butler greeting us in the hall.” The pressmen wondered what effect this would have on the appeal of supersonic transport, until they realised, over Bulgaria with 3h 30min of the flight to go, had they been on Concorde they would be in London.

Even from the opulence of his 747 first class cabin, Ramsden was convinced about supersonic transport’s commercial prospects. “Each increasingly boring subsonic minute enhances our conviction Concorde will sell,” he wrote. Contrary to British Airways commercials of the time, he wrote, “The appeal isn’t so much ‘speed, speed, speed’... Most people are nervous of speed. Bishops preach against the speeding up of our already giddy world. Time is what Concorde has to sell, and time is everyone’s most precious possession.”

Precious or not, it never caught on the way its originators hoped, and 40 years after those inaugural flights and more than 12 since Concorde’s grounding, we are into the post-supersonic era. Today it takes nearly twice as long to fly from London to Bahrain as on that 3h 38min journey in 1976. Only Aerion – a developer of a supersonic business jet concept – is pushing the lure of travelling from A to B faster than sound. Instead, efficiency, quietness and comfort have replaced speed as watchwords of aircraft design. It is difficult to imagine there ever again being a serious need for that sort of speed – not enough, certainly, to justify the many billions required to develop and operate a successor to Concorde. ■



Capt Norman Todd, flight commander, with the British Airways crew



CHANGE OF TACK

Gulf investment fund Mubadala's acquisition of Swiss MRO specialist SR Technics is starting to look like an awkward fit as mooted facilities have thus far failed to materialise

MICHAEL GUBISCH LONDON

Abu Dhabi investment fund Mubadala's bid to become a major global maintenance, repair and overhaul player began with a gradual acquisition of Swiss specialist SR Technics from 2006. In 2007, Mubadala purchased Gulf Aircraft Maintenance, subsequently rebranded as Abu Dhabi Aircraft Technologies (ADAT). But the absence of a parent fleet for these service providers posed a challenge to the ambitious growth plan.

Airlines at that time were outsourcing maintenance and spinning off technical departments as standalone businesses. But, especially in a consolidating MRO environment, established airline-affiliated service providers such as Air France Industries KLM Engineering & Maintenance and Lufthansa Technik had a clear advantage – their parent fleets provided a base workload.

Scale effects, combined with leverage in negotiations with original equipment manufacturers to access repair know-how, helped these competitors win third-party business.

Abu Dhabi's Etihad Airways has been a central customer for ADAT, and SR Technics con-

tinued to support the fleet of its former parent Swissair's successor carrier Swiss, though some work packages were switched to parent Lufthansa's maintenance operation. However, there is – especially in regard to gaining access to manufacturers' repair information – a clear need for independent third-party MRO providers to co-operate either with OEMs or with airlines operating huge fleets, to facilitate support of new-generation equipment.

COLLABORATIONS

Mubadala opted to collaborate with manufacturers such as General Electric, Honeywell, Rolls-Royce and – in the military arena – Lockheed Martin and Sikorsky.

The investment fund additionally launched engine and component financing venture Sanad in 2010. It has also merged the senior executive teams of ADAT and SR Technics for further integration of the two service providers and started using the Mubadala Aerospace MRO Network brand for its commercial aftermarket activities.

There were also plans to establish MRO sites in Asia and North America. But apart from SR Technics opening a component

repair shop in Kuala Lumpur, Malaysia, and partnering Indonesian carrier Garuda's maintenance division for the support of certain equipment, Mubadala has not expanded its MRO footprint as planned.

The group's MRO Network brand was quietly dropped and, in 2014, Mubadala sold ADAT's airframe and component maintenance activities to Etihad. These have been rebranded as Etihad Airways Engineering.

ADAT's engine shop was, meanwhile, set up as a unit in its own right under a new name – Turbine Services & Solutions – with a view to expanding overhaul capabilities for new-generation engines.

Mubadala considered divesting SR Technics, too; the fund's aerospace and defence systems executive director, Grant Skinner, told *Flight International* during the Dubai air show in November 2015 it had offers on the table from potential investors. Industry sources indicate Russian investors were interested in acquiring the Zurich-based MRO provider.

In early 2013, Russian flag carrier Aeroflot disclosed plans to establish two ventures for airframe and component maintenance in its homeland, with SR Technics and state corpo-



A hangar belonging to ADAT, the former Gulf Aircraft Maintenance

ration Rostec. However, that plan has been abandoned, possibly owing in part to EU and US sanctions against Russia over intervention in Ukraine, and the rouble's devaluation.

Skinner says Mubadala has not ruled out a potential sale of SR Technics, or parts of that business. But he adds the fund is “not actively” looking for investors or pursuing an “exit strategy”. The maintenance subsidiary, he asserts, is still a “core” part of Mubadala's aerospace division.

SR Technics has also had to grapple with the cost of doing business in its homeland. Zurich was always a high-cost location, and the maintenance provider has struggled for some time to define a niche for its services. Compounding the problem, the Swiss central bank in January 2015 ended a policy of intervening to maintain a ceiling on the franc-euro exchange rate, leading to a surge of some 40% in the value of the Swiss currency – making Swiss exports, such as SR Technics' services, that much more expensive for foreign customers.

In 2010, management decided to conduct VIP completions on new business jets. But that activity did not generate sufficient volume and the executive team reviewed its strategy again in 2013. A contract from SAS to refurbish the Scandinavian airline group's long-haul fleet cabins – in tandem with heavy checks – brought an opportunity to combine high-end interior work with traditional MRO.

More sustained business is likely to come from closer co-operation between Mubadala and Etihad. Mubadala revealed at the Dubai show that the maintenance specialist will become “preferred service provider” for Etihad's airline group, giving SR Technics what is arguably the closest alternative to a parent fleet.

As part of the deal, Air Berlin – in which the Gulf carrier has a 29% shareholding – tentatively extended an engine MRO agreement for its Airbus fleet with SR Technics by five years until 2024. This followed an earlier accord with Etihad, disclosed in mid-2015, which covers component maintenance for the airline's Boeing 787 fleet. Further work is likely to come from other partners, such as Alitalia and Air Serbia.

Mubadala and Etihad plan to establish a maintenance facility in eastern Europe to consolidate heavy checks for the group's narrowbody fleet at a low-cost location. Neither a timescale nor a location was specified for the project at Dubai.

However, Skinner points to a likely location for the new maintenance site, stating: “We really like Serbia.”

Sources familiar with Etihad's technical operations tell *Flight International* the airline has evaluated a co-operation with Belgrade-based maintenance specialist Jat Tehnika, formerly a division of Air Serbia predecessor Jat Airways. SR Technics established a subsidiary in the Serbian capital for administrative functions in early 2015, after the maintenance provider made 250 such roles redundant at its Zurich headquarters.

EUROPEAN SHIFT

In Malta, SR Technics opened a dedicated facility for heavy checks on narrowbody types in 2010. But the site has struggled to attract business beyond its main client, EasyJet.

With the UK budget carrier reviewing its maintenance strategy, SR Technics has evaluated the future of its Malta operation. The MRO specialist's commercial chief Andrew Best told *Flight International* in October 2015 management would have clarity about the site

by year-end. But in early January, SR Technics declined to provide detail.

Skinner says the establishment of an additional narrowbody heavy maintenance centre does not automatically mean SR Technics' Malta site will be abandoned.

At 2015's Dubai air show, Mubadala did at least show some progress with its plan for an engine overhaul shop in Al Ain. The fund signed an agreement with GE to “finalise” their planned joint venture to support GEnx engines. That partnership – alongside a similar accord with R-R for Trent XWBs – had been revealed at the 2013 show. There had been no visible progress in the meantime.

With EasyJet reviewing its maintenance strategy, SR Technics has evaluated the future of its Malta facility

Mubadala, however, has still not given a timeline for the planned facility.

Under the renewed agreement, GE will build a logistics centre for the GEnx, while Mubadala's engine MRO subsidiary is set to expand its overhaul capabilities to include the type, which powers the 787 and Boeing 747-8.

Skinner says Mubadala still intends to support Trent XWB engines and is holding “positive” discussions with R-R. The fund's engine MRO operations also feature in R-R's after-market plans as the UK engine maker expands its overhaul network to support the sole powerplant available for the Airbus A350.

Since 2013, Mubadala and R-R have separately changed their MRO strategies. Mubadala concentrates on engine support and R-R has broadened its maintenance network to include more external partners.

Skinner says further news about a co-operation with R-R to support Trent XWBs will be disclosed in the “hopefully not-too-distant future”. ■



The sovereign wealth fund parent reportedly considered divesting its SRT business

BORN AGAIN

With the first A380s set to arrive on the used market in the next few years, will the world's largest airliner prove popular with carriers unable to afford a new one? Or will second-hand versions prove as stubborn to shift as freshly-minted examples of the double-decker?

MURDO MORRISON LONDON

When the Airbus A380 began flying passengers in 2007, the manufacturer hailed the double-deck transport a game-changer. It still does, citing the emergence of space-constrained hubs as the key factor that will force airlines to seek the largest-capacity aircraft on the market. However, total sales of just over 300 superjumbos – around half of them to Emirates – have failed to bear out the claim. Despite plaudits from customers and travellers alike, perhaps the best that can be said of the A380 is that it is outselling the passenger version of its even less popular ultra-large rival, the Boeing 747-8.

An eleventh hour deal for three aircraft from a new airline customer – thought to be Japan's ANA – saved Airbus from the humiliation of ending another year with zero new A380 orders. But with 27 deliveries in 2015, the already modest backlog shrank further. The first used A380s will begin arriving on the market before the end of the decade. Some believe this could hit the superjumbo's flagging prospects; others that it could give a boost to its

image by broadening its appeal to charter and tertiary carriers who could not contemplate a new A380.

Mark Lapidus takes the latter view. The chief executive of Dublin-based Amedeo is the A380's biggest fan in the leasing world, and placed an order for 20 examples at the 2014 Singapore air show. Amedeo is focusing much of its sales effort on the used market, where Lapidus is convinced the type will prove popular once the first examples are offloaded by early adopters; Singapore Airlines and Emirates took their first A380s in 2008 and 2009, respectively. "We have as many campaigns in the secondary market as we do for new aircraft," he notes.

LOWER RISK

Amedeo is "working closely with Airbus" to remarket the first A380s, which will begin leaving fleets in 2018. Prospects include "blue chip" and "secondary" airlines. Lapidus believes airlines operating small widebody fleets with "multiple frequencies" and a mainly economy-class offering will be the likeliest customers for secondhand A380s. However, he maintains that larger flag-carriers will



It seems like a good deal at the time, but needs have changed for Malaysia Airlines



"Airbus appear to have a few open slots in late 2016/2017, with significant slots after"

ROB MORRIS

Head of consultancy, Ascend

be interested in trialling A380s as a "lower-risk" alternative to investing in new examples. Even Airbus acknowledges convincing airlines to invest in a new A380 is a challenge.

In Toulouse's favour, perhaps, is that the flow of the 500 to 600-seaters onto the secondary market will be extremely slow – only 41 were delivered between 2007 and 2010 (see table). However Lapidus believes this limited supply will give prospective airline customers plenty of time to weigh up the value proposition of the quadjet without any need for distress selling. "The fact that you can pick up a 10- or 12-year-old A380 at half the price of a new one" makes the type an attractive proposition to many carriers, he says.

Others are not so convinced. "It's challenging to think of potential operators who could profitably take an aircraft of this capacity and range," says Rob Morris, head of consultancy at Flightglobal's Ascend business. If operators of secondhand 747-400s are taken as a guide, "it isn't really a who's who of network airlines", he notes, listing the likes of Atlas Air, Conviasa, Corsair, Iraqi Airways, Kabo Air,



Emirates accounts for around half of Airbus's A380 order backlog

MaxAir, Orient Thai Airlines and Wamos Air, as well as Royal Air Maroc and Saudia. "The majority of these have only one or two aircraft each," he adds.

A more effective remarketing route might be to place A380s with operators of the superjumbo, Morris suggests, but one of the main stumbling blocks is the cost of reconfiguring highly-bespoke cabins. However Lapidus maintains refitting 10- to 15-year-old A380s to a new customer's requirements is not much of a hurdle and refurbishments need only cost "\$10-15 million, \$20 million tops". Usually only the upper deck, where most premium seating is, needs extensive work, he says.

Earlier this month, IAG chief executive Willie Walsh surprised many when he revealed at a conference in Dublin that the group's biggest subsidiary, British Airways, is looking at acquiring "five or six" secondhand A380s to add to its fleet of 12 new superjumbos, the final two of which are due for delivery this year. At the same time, Walsh confirmed that BA is not interested in converting its nine options with Airbus into firm orders as the aircraft being offered are "too expensive", Walsh also stated that IAG could also be interested in adding A380s to the fleet of its Spanish flag-carrier subsidiary Iberia, which operates Airbus A340s on its long-haul routes.

The IAG boss happily admits that the A380 is a "fantastic" aircraft and is popular with passengers. He says that putting two A380s onto BA's London Heathrow to Los Angeles

AIRBUS A380 DELIVERIES BY YEAR

| | |
|------|----|
| 2007 | 1 |
| 2008 | 12 |
| 2009 | 10 |
| 2010 | 18 |
| 2011 | 26 |
| 2012 | 30 |
| 2013 | 25 |
| 2014 | 30 |
| 2015 | 24 |

SOURCE: Airbus

route has allowed the airline to replace three 747-400s and free up a valuable slot at an over-capacity Heathrow. So why does IAG not want more? The A380 is an "inflexible" airliner, Walsh maintains. It works on longer-haul routes where frequencies are not crucial (hence BA's swapping three Los Angeles flights with two), he says, and where the carrier can fill what is an expensive aircraft to operate, even with cheaper fuel prices. That goes some way to explaining perhaps why IAG is tempted by cheaper superjumbos but not by any more A380s fresh off the production line.

Airbus and rival powerplant manufacturers Engine Alliance and Rolls-Royce are prepared to support airlines buying "as few as four or five" A380s on the secondary market, with performance guarantees and a global maintenance, repair and overhaul network, maintains Lapidus. This sort of commitment is likely to

be crucial to any airline considering leasing secondhand examples of an aircraft as complex as an A380, with a small worldwide fleet. "Airbus have had a sea change in philosophy," he says. "They realise that a secondary market is essential to selling new planes."

Morris agrees the manufacturers will have thought this through. "While the cost of reconfiguration will be a potential barrier to transitioning an aircraft such as the A380 between operators, it is an issue Airbus will always have been aware of and thus they will be taking steps to minimise the cost and simplify the whole process," he says. "Maintenance cost will be another key issue and here engine support programmes will need to be portable between operators for easier transition."

No one should expect a glut of used A380s arriving on the market. Flightglobal's Fleets Analyzer shows only a handful of lease returns are scheduled through to 2020, including the first five Singapore Airlines examples leased from Dr. Peters Group. These are likely to be replaced by the five new aircraft still in backlog with the flag-carrier, says Morris. A few Emirates aircraft, leased from Doric, are scheduled to begin their lease returns in 2019. Additionally, he notes, Malaysia Airlines has indicated its A380s are surplus, and these could be offered for sale or lease in the near future.

FORCED DISCOUNTING

Could even such a small flow of secondhand aircraft persuade airlines who might have been considering a new A380 to opt for a used one instead, or force Airbus to compete with itself by discounting on production aircraft? Morris thinks it could have some effect. "The A380 backlog is around 140 aircraft, with Emirates accounting for around half of that. At current production rates, Airbus appear to have a few open slots in late 2016 and 2017, with significant slots after that," he says. "So the lease returns will be arriving in the market at the same time as these open slots."

However, while Morris believes this may have some impact on Toulouse's pricing potential on new aircraft, he does not think it will have a marked effect on A380 orders, with Airbus securing a negligible number since the last flurry of commitments for the superjumbo at the November 2013 Dubai air show. "I suggest that it is the overall lack of apparent demand per se that will have a greater impact, with Airbus probably needing to offer discounts to incentivise potential new customers into the aircraft," he says.

The experience of other large widebodies on the secondary market perhaps provides some pointers as to the fate of used A380s. With even the top-selling 747-400 struggling to find a market beyond third-tier airlines, other types have fared even less well, notes Morris. The four-engine Airbus A340 became almost obso-

» lete when the fuel price rocketed and against competition from the Boeing 777. But even the 777-200ER is facing problems as secondhand examples arrive on the market having to compete with new Boeing 787s and 777-300ERs and Airbus A350s, he says.

“I guess the rule of thumb is the larger the aircraft, the smaller the customer base is likely to be, and the more difficult liquidity proves in the secondary market,” says Morris. “As the A380 is the largest, it will potentially face the largest of challenges.” But the A380 is not the only one exposed. “Let’s be clear, the 777-300ER is likely to face a similar challenge in the next few years as it starts to see significant lease returns and also significant new production availability from Boeing,” he says.

Traditionally the biggest secondary market for large widebodies – dating back to the original Boeing 747s and McDonnell Douglas MD-11s – has been freight conversions, notes Morris’s colleague Richard Evans, senior consultant at Ascend. However, with Airbus having given up on its A380 freighter variant years ago, the prospect of the world’s largest airliner enjoying a second life as a cargo transport appears a pipe dream. “That market is dead,” says Evans. “Nobody seriously expects an A380 P2F [passenger to freighter] programme.”

Another worrying trend for anyone looking to remarket the A380 – or any other widebody for that matter – is that, despite the growth in the long-haul fleet, numbers of widebody transactions on the secondary market appear to be shrinking, suggests Evans. “Most airlines seem to be acquiring an ever-higher proportion of their fleets as new aircraft. The larger the aircraft, the fewer the number of transitions to



British Airways operates 10 new A380s; its final two examples arrive this year

new operators, with the 767 the most successful and the A330, A340 and 777 less so,” he says. “How the 777-300ER fares will be a big test before the A380 hits the market.”

Almost a decade after its introduction, Airbus is firmly behind its most ambitious programme, with sales chief John Leahy earlier in January promising more A380 customers in 2016. However, unlike in previous years, he is cautious not to speculate about numbers, joking that an earlier prediction of around 25 orders in 2015 had “cost me a lot of bonus”. Toulouse also is still not ruling out a re-engined, or even stretch, version of the super-jumbo, although this might appear a dangerous gamble when it already faces a challenge to maintain output levels into the next decade.

Amedeo, which is due to start taking deliveries of its first A380s next year – although it has not yet specified an engine choice – devotes much of its website to praising the aircraft’s economics, suggesting that in a 590-seat configuration, the A380 offers unbeatable seat mile costs. Lapidus believes “the trend towards larger gauge aircraft” will continue and this does not only apply to those ordering new aircraft.

“There is no logical reason there shouldn’t be a secondary A380 market,” he says. Airbus will be hoping that is true. The prospect of several of its flagship airliners languishing in desert storage early in the next decade is an image that must fill Leahy and his colleagues with horror. ■



Singapore Airlines kicked off the A380 era in 2007; by 2020, five of its early, leased examples will be replaced by new aircraft

From yuckspeak to tales of yore, send your offcuts to murdo.morrison@flightglobal.com

Not according to Pan for Gatwick

Those backing Gatwick expansion as the solution to the UK's capacity problems may want to reconsider. Building a second runway could unleash "the forces of chaos and disorder" controlled by the god Pan, the airport's "genius loci", the site's protective spirit in Roman mythology.

This is the warning from one Dr Haraldur Erlendsson, an psychiatrist from Iceland, who researches "the application of sacred geometry, place names and shamanic techniques to unlock ancient earth mysteries".

Erlendsson says enlarging Gatwick would be "like driving a motorway through Stonehenge, or flattening Glastonbury Tor. Adding another runway is guaranteed to damage the subtle, natural harmony and balance of the land, maybe beyond repair."

For anyone still unconvinced, the academic, who spent some years living near Gatwick, adds: "Imagine the kind of retribution a piqued Pan might mete out to Gatwick expansionists who blithely ignore his warnings!"

The deity's views of a third runway at Heathrow or Boris Island are not clear.

Swear it's true

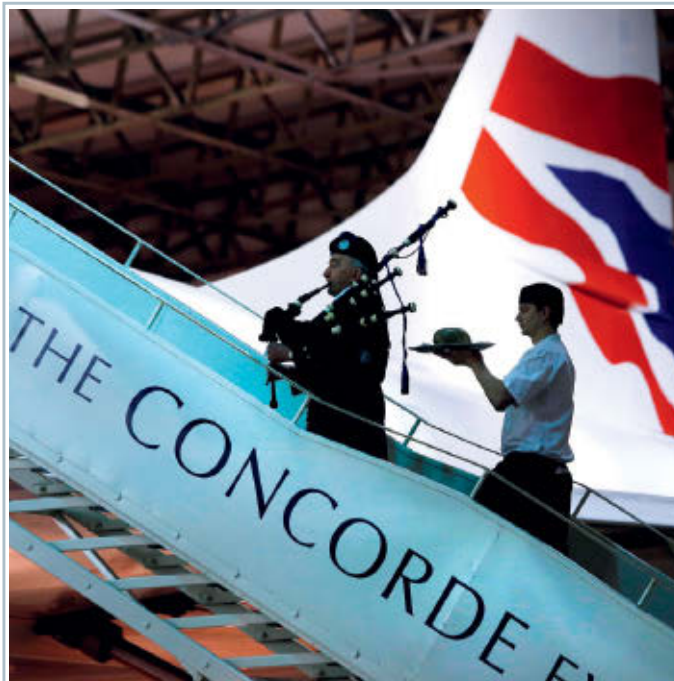
At a conference last week, Willie Walsh told a tale of being mistaken for the other famous Irish airline boss while he was enjoying a pint in a Glasgow pub with a colleague.

"I know you, you're Michael O'Leary. I've seen you on telly," the fellow-drinker insisted.

The IAG chief politely



Walsh: Dublin-up for O'Leary



"It's an odd shape, its origins go back a long way and not everyone likes what's inside... and that's just Concorde."

corrected him, but the well-refreshed local was having none of it, claiming the Guinness and Irish accent were giveaways.

Finally, Walsh's patience snapped: "I told him to f*** off and leave us in peace."

The stranger stepped back, paused, and with a triumphant expression exclaimed: "I knew you were Michael O'Leary."

Cut to the chase

Meanwhile, the usually close-cropped Walsh appeared at the event sporting a new skinhead look, something that may worry management colleagues as they wrestle with departmental budgets. "I got a new haircut and warned the guys this is going to be the theme for 2016," says the Irishman.

C Serious?

Delta is "seriously looking" at the C Series. Notes one of our more cynical colleagues: "Must mean they are posturing for a more attractive deal from Airbus or Boeing."

It's called doing an O'Leary.

Burns flight

To mark Burns' Night and the 40th anniversary of Concorde's first commercial flight (marked elsewhere in this issue), staff at the National Museum of Flight near Edinburgh have piped a haggis on board the museum's G-BOAA, the British Airways aircraft that made that historic flight on 21 January 1976.

On board that flight was a haggis for the Gulf state's expat Scots community to help them celebrate the birth of the country's national poet.



Don't mess with Pan

Lack of Flight

As demand for "FLIGHT" is so great, readers should

100 YEARS AGO

place orders firmly for copies at the bookstalls, their newsagents, or

direct from the publishers, to secure a copy. The semi-famine in printing paper calls for this precaution in order that only actual numbers required are printed.

Night-time raids

In the bombing competition with Germany, the R.A.F. and

75 YEARS AGO

Luftwaffe continued to strike regular blows. The

Germans raid by night whenever the weather is favourable, selecting cities which are certainly important and contain military targets, but not showing much discrimination as to where they drop their bombs.

Salisbury boycott

Yesterday, January 26, was the date of the last BOAC

50 YEARS AGO

service through Salisbury, Rhodesia, until the present

difficulties there have been resolved. African services will fly Nairobi-Johannesburg direct to overcome the embargo by east African countries on aircraft having passed through Salisbury.

Airlines lose \$2bn

US airline losses reached \$2 billion last year — twice as

25 YEARS AGO

high as anything previously recorded. A further \$600

million in losses are expected in the first quarter.

FG

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Manston's future lies as an airport

I totally share the despair of Laurent John Ghibaut regarding the lack of action in bringing Manston airport back into use (*Flight International*, 5-11 January). The enthusiasm of residents to see aircraft back is quite phenomenal. Usually the anti-flying groups are in the majority, but the residents of this area who are for reinstatement are well in the majority. A petition signed by 22,000 people was handed to prime minister David Cameron in favour of reinstatement.

When the airport was bought by a well-known transport entrepreneur there was a promise that a two-year plan would be initiated to improve business.

In fact after two months the airport was suddenly closed, leaving several freight carriers, such as Cargolux, high-and-dry, along with KLM – which provided a link to Schiphol Amsterdam; a well established flying school; a general aviation maintenance facility and several associated businesses. The cargo operators held the facilities in high

regard due to the 90min turnaround provided; a recent report by London Heathrow airport stated that a main cargo company there had to wait five days for a slot.

Not surprisingly, a development company now owns Manston – presumably with the intention of building unwanted houses on the site – but for over a year now a US organisation has been trying to buy the airfield. This would be completely financed by US money, so there would be no cost to the local taxpayers, but the council is reluctant to co-operate.

The latest plan is to override

the council and get the airport to be considered a matter of national importance to get the government involved, along with the would-be buyer, which is still committed.

The business plan of this US firm is superb and would provide jobs in an area greatly in need of employment.

As for the suitability of the runway, need I say more than Manston has been used for pilot training on the Airbus A380 and Boeing 777?

Let's hope that some common sense is brought into action.

Dave Hayfield

Acol, Kent, UK

DESIGN

Tailsitter concept's nothing new



Northrop's unmanned TERN has a distinctly retro quality

I note in your article (*Flight International*, 5-11 January) that Northrop Grumman has won a US Defense Advanced Research Projects Agency contract to develop an unmanned tailsitter to be operated from ships at sea, similar to the Lockheed XFV-1 and Convair XFY-1 projects of the 1950s.

In a series of publications written by Jared A Zichek, the writer tells us that Northrop did a similar project, the N-63 Convoy Fighter, back in November 1950. This was powered by a twin-turboprop Allison XT-40-A-8 driving a 15.5ft diameter contra prop. It was to have a 0-528kt (976km/h) performance and a ceiling of 14,300m (47,000ft).

Other contenders in the project were the Martin Model 262 and the Goodyear GA-28A/B Convoy Fighters.

As you see, it has all been thought of before.

Geoff Hill

via email

Military sets a glowing example

I read about an airprox incident on 16 July 2015 between a Royal Air Force BAE Systems Hawk T1 and a glider above Pateley Bridge, North Yorkshire, UK.

I recall military aircraft with day-glo panels.

A glider wearing these would have been instantly spotted.

Anthony Atkinson

North Allerton, North Yorkshire, UK

Taking command of the cockpit

James Bowyer's letter discussing how the lack of piloting skills resulted in the loss of AirAsia flight QZ8501 in 2014 and Air France flight AF447 in 2009 (*Flight International*, 12-18 January), gives rise to two comments.

The first is that, as demonstrated on AF447, an on-flightdeck state of flawed discipline, inter-crew communication and panic is utterly unacceptable and unforgivable from a professional aircraft crew.

Secondly, I would not have thought it beyond the wit of man to fit a system providing synthetic feel and interaction for Airbus sidestick controls. In what one might hope is the interim, there is a routine I thought useless and pretentious in the days when the movement of flight controls were linked to interact mechanically or by any other means and so immediately evident to two pilots side-by-side, as opposed to in tandem.

It simply involves the person taking the controls announcing: "I have control!"

Richard Chandless

Creches sur Saone, France

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EDITORIAL, ADVERTISING, PRODUCTION & READER CONTACTS

EDITORIAL +44 20 8652 3842

**Quadrant House, The Quadrant,
Sutton, Surrey, SM2 5AS, UK**
flight.international@flightglobal.com

Editor Craig Hoyle

+44 20 8652 3834 craig.hoyle@flightglobal.com

Deputy Editor Dominic Perry

+44 20 8652 3206 dominic.perry@flightglobal.com

Head of Strategic Content Murdo Morrison FRAeS

+44 20 8652 4395 murdo.morrison@flightglobal.com

Features Editor Dan Thisdell

+44 20 8652 4491 dan.thisdell@flightglobal.com

Business & General Aviation Editor Kate Sarsfield

+44 20 8652 3885 kate.sarsfield@flightglobal.com

Aerospace and Defence Reporter Beth Stevenson

+44 20 8652 4382 beth.stevenson@flightglobal.com

Consulting Editor David Learmount

+44 7785 901787 david.learmount@ntworld.com

Magazine Enquiries

flight.international@flightglobal.com

AIR TRANSPORT TEAM

Editor Flightglobal Premium News Graham Dunn

+44 20 8652 4995 graham.dunn@flightglobal.com

Managing Editor Niall O'Keeffe

+44 20 8652 4007 niall.okeeffe@flightglobal.com

Air Transport Editor David Kaminski-Morrow

+44 20 8652 3909

david.kaminski-morrow@flightglobal.com

Air Transport/MRO Reporter Michael Gubisch

+44 20 8652 8747 michael.gubisch@flightglobal.com

Senior Reporter Oliver Clark

+44 20 8652 8534 oliver.clark@flightglobal.com

AMERICAS

Americas Managing Editor Stephen Trimble

+1 703 836 8052 stephen.trimble@flightglobal.com

Deputy Americas Editor - Air Transport Ghim-Lay Yeo

+1 703 836 9474 ghimlay.yeo@flightglobal.com

Air Transport Reporter Edward Russell

+1 703 836 1897 edward.russell@flightglobal.com

Air Transport Reporter Jon Hemmerdinger

+1 703 836 3084 jon.hemmerdinger@flightglobal.com

Aviation Reporter James Drew

+1 703 836 7442 james.drew@flightglobal.com

ASIA/PACIFIC

Asia Editor Greg Waldron

+65 6780 4314 greg.waldron@flightglobal.com

Asia Air Transport Editor Mavis Toh

+65 6780 4309 mavis.toh@flightglobal.com

Asia Finance Editor Ellis Taylor

+65 6780 4307 ellis.taylor@flightglobal.com

Reporter Aaron Chong

+65 6780 4851 aaron.chong@flightglobal.com

EUROPE/MIDDLE EAST

Israel Correspondent Arie Egozi

FLIGHTGLOBAL.COM

Web co-ordinator Rebecca Springate

+44 20 8652 4641

rebecca.springate@flightglobal.com

EDITORIAL PRODUCTION

Head of Design & Production Alexis Rendell

Global Chief Copy Editor Lewis Harper

Chief Copy Editor, Europe Dan Bloch

Layout Copy Editors Max Hall, Sophia Huang,

Tim Norman

Global Production Editor Louise Murrell

Deputy Global Production Editor Terence Burke

Deputy Digital Producer Damion Diplock

Web Production Editor Andrew Costerton

Senior Designer Lauren Mills

Consulting Technical Artist Tim Hall

DISPLAY ADVERTISEMENT SALES

**Quadrant House, The Quadrant,
Sutton, Surrey, SM2 5AS, UK**

EUROPE

Global Sales Manager Mark Hillier

+44 20 8652 8022 mark.hillier@flightglobal.com

Key Account Manager Grace Hewitt

+44 20 8652 3469 grace.hewitt@flightglobal.com

Sales Support Gillian Cumming

+44 20 8652 8837 gillian.cumming@rbi.co.uk

NORTH & SOUTH AMERICA

Vice-President, North & South America

Rob Hancock +1 703 836 7444

robert.hancock@flightglobal.com

Regional Sales Director

Warren McEwan +1 703 836 3719

warren.mcewan@flightglobal.com

Sales Executive Kaye Woody

+1 703 836 7445 kaye.woody@flightglobal.com

Reed Business Information, 333 N. Fairfax Street,

Suite 301, Alexandria, VA 22314, USA

ITALY

Sales Manager Riccardo Laureri

+39 (02) 236 2500 media@laurerassociates.it

Laureri Associates SRL, Via Vallazze 43,

20131 Milano, Italy

ISRAEL

Sales Executive Asa Talbar +972 77 562 1900

Fax: +972 77 562 1903 talbar@talbar.co.il

Talbar Media, 41 HaGiva'a St, PO Box 3184, Givat

Ada 37808, Israel

ASIA/AUSTRALASIA

Key Account Manager Jay Ee

+65 6780 4301 jay.ee@flightglobal.com

Fax: +65 6789 7575

1 Changi Business Park Crescent,

#06-01 Plaza 8 @ CBP, Singapore 486025

RUSSIA & CIS

Director Arkady Komarov

komarov@worldbusinessmedia.ru

Tel/Fax: +7 (495) 987 3800

World Business Media, Leningradsky Prospekt, 80,

Korpus G, Office 807, Moscow 125190, Russia

CLASSIFIED & RECRUITMENT

Sales Manager Sophie Wild

+44 20 8652 4239

sophie.wild@rbi.co.uk

Recruitment & Classified Key Account

Manager Craig Middleton +44 20 8652 4900

craig.middleton@rbi.co.uk

Recruitment & Classified Sales Executive

Chris Harding +44 20 8652 4900

recruitment.services@rbi.co.uk

Key Account Manager - Asia Jay Ee

+65 6780 4301

jay.ee@rbi.co.uk

ADVERTISEMENT PRODUCTION

Production Manager Sean Behan

+44 20 8652 8232 sean.behan@rbi.co.uk

Production Manager Classified Alan Blagrove

+44 20 8652 4406 alan.blagrove@rbi.co.uk

MARKETING

Marketing Director Justine Gillen

+44 20 8652 8031 justine.gillen@flightglobal.com

DATA TEAM

Head of Data Pete Webber

+44 20 8564 6715

peter.webber@flightglobal.com

Commercial Aviation Steven Phipps

+44 20 8564 6797

steven.phipps@flightglobal.com

Fleet Research Manager John Maloney

+44 20 8564 6704

john.maloney@flightglobal.com

PUBLISHING MANAGEMENT

Chief Operating Officer

Philippa Edward

Executive Director Content

Max Kingsley-Jones

max.kingsley-jones@flightglobal.com

Publisher Stuart Burgess

stuart.burgess@flightglobal.com

READER SERVICES

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Jenny Smith

Flight International

Subscriptions, Reed Business Information,

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West Sussex, RH16 3DH, UK

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General

CARGOITALIA SPA IN LIQUIDATION COMPOSITION WITH CREDITORS PROCEDURE N. 6/2012 - COURT OF BUSTO ARSIZIO

INVITATION TO BID FOR THE PURCHASE OF THE GENERAL ELECTRIC CF6-80 C2D1F ENGINE

Notice is hereby given that Cargoitalia Spa in liquidation has expressed its interest in receiving bids for the purchase of the

GENERAL ELECTRIC CF6-80 C2D1F ENGINE

(ESN: 702446 – Condition: SV – TSN: 57847 – CSN: 8874 – TSLSV: 8181 – CSLSV: 1255)

The bidders for the purchase of the foregoing engine must send their bids **no later than 12.00 AM on 10 February 2016** to the certified e-mail address cp6.2012@pecfallimenti.it and to the e-mail address carlo.canziani@canzianiandpartners.com. The publication of this invitation to bid and receipt of any bids does not give rise to obligations and/or commitments on the part of the Procedure, the Judicial Liquidator, the Court and/or of Cargoitalia Spa in liquidazione to assume any rights or claims, for any reason or cause, from the parties interested in the purchase. This invitation does not represent a public offering pursuant of the Italian Civil Code, not a solicitation of public savings.

**For informations, contact the Judicial Liquidator,
Carlo Alberto Canziani, at
carlo.canziani@canzianiandpartners.com.**

Busto Arsizio, January 15, 2016

The Judicial Liquidator
dott. Carlo Alberto Canziani

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JCB seek to appoint a Director of Aviation to manage their Corporate Flight department. Based at East Midlands airport, the department consists of sixteen staff who are responsible for the operation of a Gulfstream 650 and two Sikorsky S-76 helicopters. In its 55th year of operation, the JCB Flight Department is an integral part of the JCB Group supporting its manufacturing and sales operation worldwide.

The successful candidate will hold, or have held an EASA commercial licence (rotary or fixed wing) and will have a sound knowledge of relevant EASA and national regulation. Strong leadership and management skills are essential as well as sound commercial judgment and a broad aviation background. Reporting to the Company Secretary, the position has wide ranging responsibilities in addition to any flying duties. Ensuring compliance with the forthcoming PART NCC regulation is essential in addition to budgetary control, contract negotiation and delivery, maintenance of operational standards and oversight of a robust Management System. Applicants are likely to meet EASA Form 4 requirements or to have held similar positions.

The successful candidate will be expected to live close to East Midlands Airport. The position commands a competitive remuneration package including relocation support.

In the first instance applicants should email their curriculum vitae to JCB HR, with a covering letter detailing their interest with regard to this vacancy.

Applications can be sent to rachel.thompson@jcb.com

Closing date for applications: Friday 5th February 2016

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The interview is scheduled to take place in London in early March and we shall notify those who are shortlisted.

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- All of the 2-year package + mid-term passage (business class)

Available Roles

Technical Services Manager

Qualifications

- 20 years or longer experience in the industry
- 7 years or longer recent experience in Fleet Technical Management (e.g. AD, AMP/MPD, Planning, SB, work pack, etc) as well as in operational approval
- Preferably licensed EASA Part 66 B (with type rating), or C licence, or an engineering degree, previous Post Holder experience desirable.
- Detailed working knowledge on regulations, i.e. EU-OPS, Part M, Part 145

To apply quote #DD- Technical Services Manager

Senior Quality Engineers

Qualifications

- 15 years or longer experience in the industry
- 3 years or longer working experience in a quality system (145 or Ops environment) and preferably with a certifying engineer background
- EASA Part 66 B1 or B2
- Formal training on audit techniques and experience in auditing
- Good working knowledge on regulations, i.e. EU-OPS, Part M, Part 145

To apply quote #CC-Senior Quality Engineers

Safety and Environment Manager

Qualifications

- Has advanced qualification in Health and Safety holding for example NEBOSH with CMIOSH
- Proven experience in air and ground safety issues ideally with an aircraft operator
- Extensive knowledge of legislations such as EU Ops and ICAO standards for SMS
- The implementation of ERP, delivery of safety related training
- A high degree of cultural awareness

To apply quote #BB- Safety and Environment Manager

Helicopter engineers

Qualifications

- 10 years or longer experience in the industry
 - 3 years or longer experience as a certifying engineer, preferably on a current Sikorsky product
 - EASA Part 66 B1-3
 - Knowledge of EASA and UK CAA regulations
- To apply quote #AA-Helicopter Engineers

For those individuals who are interested, please apply by submitting a CV (with personal details) via email at recruitment@hmsf.gov.bn quoting the relevant reference in the subject email.

This advert was posted before, late last year, and for all those who answered to it may re-apply.

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WORK EXPERIENCE PHILIP ROBINSON

Patently an interesting vocation

After seeing the huge number of technological advances published by aviation-related businesses annually, Philip Robinson launched AeroPatent; a service which finds the developments which really matter to users

Have you always been interested in aviation?

I flew on an airliner for the first time at 20 and shortly afterwards received a flying lesson as a birthday gift from my parents. Those flights sparked an interest in aviation that, over 15 years, has become a passion and steered many professional and personal decisions in my life. An Air New Zealand captain recently told me “the aviation bug is the best to catch because it’s one of the few that makes you feel better”. I couldn’t agree more.

Tell us about your career

With memories of that flying lesson fresh, after graduating in product design I entered the aviation industry as operations officer for a flight training company. I later moved to a similar role in business aviation but in my spare time I invented and brought to market a small consumer product. This introduced me to patents and it was to have a major influence on my career. I moved into technology transfer for a few years before landing a super job as patent manager for GKN Aerospace, working with engineers and patent attorneys to protect the company’s technology portfolio. It was in 2013 I broke out to start AeroPatent. I fly privately and am working towards a commercial licence with multi-engine and instrument ratings.

What is AeroPatent?

Every week, hundreds of new aerospace patent applications are published, revealing otherwise



A flying lesson helped ignite Philip Robinson’s fascination with the sector

unknown technology that is intriguing, exciting and potentially important. But these patents can be notoriously difficult to find and interpret because patent language is, well, tiresome to say the least. What an engineer calls a ‘wing’, a patent attorney might call a ‘lift generation device’. Consider a whole document in that language and it becomes time consuming to find, read and understand. Enter AeroPatent. We monitor patent publications, simplify them, and provide search tools, interactive charts and email alerts for members to quickly find newly published aerospace technology that matters.

What have been the most interesting and newsworthy patents you have spotted?

Two recent publications generated

considerable interest. The first is an Airbus application for downward folding wingtips; an early glimpse of the A350-1100 perhaps? The second, also from Airbus, discloses an airliner mezzanine cabin which hit the headlines shortly after we broke the story. Details of both can be found on our website and social media.

With so many patents published, how many are turned into commercially viable products?

It’s widely reported only a small proportion of patented inventions become commercial products, with some reports claiming a rate as low as 5%. Companies file patent applications to protect their research and development but of course business strategy, market demand and passenger needs change. However, behind what

seems the most impractical patent application may lie a feature or principle which, under certain circumstances or market conditions could become shrewd and potentially competition-busting.

What is the biggest challenge with your job?

The biggest challenge is time. The world’s leading patent offices publish new aerospace patent applications every few days and although we have automated alerts, sophisticated software and business processes, we analyse each abstract, description and set of claims manually. That takes a lot of time, particularly when foreign translation is involved.

What do you enjoy most about your role?

Mention the word ‘patent’ and so often eyes start to glaze over. What I enjoy is seeing those glazed eyes become wide open when the technology described in patents is presented in a simple, relevant and engaging format. That’s the inspiration behind AeroPatent and I now find myself in a privileged position to indulge my passion for aerospace technology and share insight with a hungry audience. ■



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